DOCUMENT RESUME

ED 145 414 CS 003 763

AUTHOR	Fisher, Charles W.; And Others
TITLE	A Study of Instructional Time in Grade 2 Reading. Technical Report II-4. BTES (Beginning Teacher Evaluation Study).
INSTITUTION	California State Commission for Teacher Preparation and Licensing, Sacramento.; Far West Lab. for Educational Research and Development, San Francisco, Calif.
SPONS AGENCY	National Inst. of Education (DHEW), Washington, D.C.
PUB DATE	Nov 76
CONTRACT	400-750001
NOTE	201p.; See related document CS003758; A number of tables may not reproduce well due to small type
EDRS PRICE	MF-$0.83 HC-$11.37 Plus Postage.
DESCRIPTORS	*Classroom Observation Techniques; Grade 2; *Measurement Techniques; Primary Education; *Reading Achievement; *Reading Instruction; *Reading Research; Test Construction; *Time Factors (Learning)
IDENTIFIERS	*Beginning Teacher Evaluation Study

ABSTRACT

This report describes a field study of the relationship between instructional time and student achievement in nine grade-two classrooms. Amounts of time allocated to reading and to instructional settings are described for a 40-day instructional period. Student "engaged time" was also measured for a 10-day period. Relationships between both allocated and engaged time in specific reading content categories and achievement in those content categories were examined. Large differences were found in the amounts of time students were engaged in instructional activities. Positive but relatively weak relationships were found between amount of instruction and student achievement. (Author/AA)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED145414

BTES

Beginning Teacher Evaluation Study Technical Report Series
Technical Report II-4

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

A STUDY OF INSTRUCTIONAL TIME IN GRADE 2 READING

by

Charles W. Fisher

SCOPE OF INTEREST NOTICE
The ERIC Facility has assigned this document for processing to: CS SP
In our judgement, this document is also of interest to the clearinghouses noted to the right. Indexing should reflect their special points of view. TM

in collaboration with

Nikola N. Filby
Richard S. Marliave
Leonard S. Cahen
Jeffrey E. Moore
David C. Berliner

BEST COPY AVAILABLE

Submitted to

California Commission for Teacher Preparation and Licensing
1020 "O" Street
Sacramento, Ca. 95814

November 15, 1976

Far West Laboratory for Educational
Research and Development
1855 Folsom Street

San Francisco, Ca. 94103

CS003763

This work was completed pursuant to Contract #400-75-0001 between the Department of Health, Education and Welfare, National Institute of Education and the California Commission for Teacher Preparation and Licensing.

The Far West Laboratory for Educational Research and Development, 1855 Folsom Street, San Francisco, California 94103, is a nonprofit organization supported in part by the United States Office of Education and the National Institute of Education, Department of Health, Education and Welfare. The opinions expressed in this publication do not necessarily reflect the position or policy of these agencies, and no official endorsement by them should be inferred.

PREFACE

The Far West Laboratory conducts research for the California Commission for Teacher Preparation and Licensing through funds provided by the National Institute of Education. The Commission has responsibility for certifying teachers and teacher training programs in the State of California. The research that the Commission sponsors is designed to help them understand what teacher behaviors or instructional activities are beneficial for students. With a reliable knowledge base in this area the Commission and the institutions that train teachers would be better able to provide training experiences based on empirical findings relating teacher behavior to student achievement.

In previous years under the Commission's sponsorship, the Beginning Teacher Evaluation Study (BTES) has conducted empirical and methodological research on teaching which led to a belief that an important element in the study of teaching and learning is instructional time. Time allocated by teachers for learning specific academic subject matter showed considerable variation across classes, and also varied among students within these classes. Further, students appeared to be quite variable in how engaged they were in their assigned academic activities. These major variations in the amount of time students spent learning in different classes called for further investigation. During the continuation of Phase III-A for the Commission's research effort (1975-1976) the Laboratory staff was granted permission to explore some of these temporal factors in instruction. Charles Fisher headed the Laboratory team whose findings are presented in this report.

Richard Marliave, Nikola Filby and Leonard Cahen of the BTES staff contributed many creative conceptual and methodological ideas which helped shape each phase of the study.

During the course of this study encouragement and insight were provided by Annegret Harnischfeger and David Wiley. We are grateful for their longstanding interest in our work, and the constructive comments that they offered.

During the analysis phase, the Laboratory was fortunate to receive helpful comments from a number of distinguished consultants. We thank, in particular, Leigh Burstein, Robert Linn, Richard Shavelson, and Ross Traub for their help.

Jeffrey Moore, Pat Storm, and Mark Phillips of the BTES staff provided reliable support for the substantial data processing effort. Marilyn Dishaw, Faye Mueller, and Fannie Walton coordinated many of the field activities and technical services so necessary for a field study that required the collection and processing of large quantities of data from natural classroom settings. Their efforts, and the efforts of the many field workers who assisted with the data collection are greatly appreciated.

Deborah Walton patiently and efficiently typed the final copy and the many complex tables. Edna Robnett and Jeremy George provided clerical support. We thank them for their help.

Finally, our thanks and appreciation go to the teachers and students in California schools who continue to support this project by donating their time and comments. The hard work of many teachers, in addition to their regular

classroom responsibilities, makes this research possible. To each of these dedicated volunteers we owe a special thanks.

David C. Berliner
Principal Investigator
Beginning Teacher Evaluation Study
November, 1976

TABLE OF CONTENTS

		Page
	PREFACE	i
I	INTRODUCTION	1
II	DESIGN AND INSTRUMENTATION	8
	Design	8
	Measures of Reading Achievement	9
	Measure of Academic Status	13
	Process Variables	13
	Subject matter and instructional setting categories	14
	Teacher logs	16
	Teacher log procedure	19
	Direct observation	24
	Direct observation procedure	28
	Observer reliability	33
	Student engagement rates	36
	Sample	38
III	THE COLLECTION AND ANALYSIS OF DATA	44
	Data Collection	44
	Analysis	49
IV	RESULTS	54
	Characteristics of Teacher Allocated Time Logs	56
	Allocation of Instructional Time in Reading	68
	Instructional Time and Student Achievement	80
	Results from the OA-OB period	81
	Results from the A-B period	86
	Summary	118
V	DISCUSSION	119
	Characteristics of Teacher Allocated Time Logs	119
	Allocation of Instructional Time in Reading	123
	Instructional Time and Student Achievement	125
	Summary and Conclusions	130
	REFERENCES	132
	APPENDIX A: Directions and Examples of Items from Achievement Tests	134
	APPENDIX B: Reading Content Categories and Examples of Teacher Logs	151
	APPENDIX C: Teacher Rating Forms	162

LIST OF TABLES

		Page
2.1	Reliability coefficients for reading subscales at each testing occasion	11
2.2	Interobserver correlations for content category by setting combinations	35
2.3	Estimates of average class engagement	39
3.1	Summary of data collected on nine Grade 2 classes	44
4.1	Class size, length of school day, adult instructional time and time allocated to reading for nine Grade 2 classes	54
4.2	Means, standard deviations, and correlations for Class 1 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation	59
4.3	Means, standard deviations, and correlations for Class 2 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation	60
4.4	Means, standard deviations, and correlations for Class 3 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation	61
4.5	Means, standard deviations, and correlations for Class 4 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation	62
4.6	Means, standard deviations, and correlations for Class 5 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation	63
4.7	Means, standard deviations, and correlations for Class 6 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation	64
4.8	Means and standard deviations for time allocated to general content categories in reading for nine Grade 2 classes	70

		Page
4.9	Means and standard deviations for time allocated to specific content categories in reading for nine Grade 2 classes	71
4.10	Means and standard deviations for time allocated to setting combinations during reading in nine Grade 2 classes	76
4.11	Means, standard deviations and intercorrelations for estimates of student engagement in six Grade 2 classes	78
4.12	Means and standard deviations for achievement measures and engaged time in matched content categories over the OA-OB period for six Grade 2 classes	83
4.13	Means, standard deviations, and intercorrelations for achievement in compound words and associated measures of engaged time assessed over the OA-OB interval	85
4.14	Means and standard deviations for achievement measures and allocated time in matched content categories over the A-B period for nine Grade 2 classes	87
4.15	Achievement in compound words (post) regressed on achievement in compound words (pre), academic status and measures of allocated time over the A-B interval (subjects pooled, N = 79)	93
4.16	Achievement in compound words (post) regressed on achievement in compound words (pre), academic status and measures of allocated time over the A-B interval (subjects pooled within class, N = 79)	94
4.17	Achievement in compound words (post) regressed on achievement in compound words (pre), academic status and measures of estimated engaged time over the A-B interval (subjects pooled, N = 56)	95
4.18	Achievement in compound words (post) regressed on achievement in compound words (pre), academic status and measures of estimated engaged time over the A-B interval (subjects pooled within class, N = 56)	96
4.19	Achievement in long vowels (post) regressed on achievement in long vowels (pre), academic status and measures of allocated time over the A-B interval (subjects pooled, N = 91)	98
4.20	Achievement in long vowels (post) regressed on achievement in long vowels (pre), academic status and measures of allocated time over the A-B interval (subjects pooled within class, N = 91)	99
4.21	Achievement in long vowels (post) regressed on achievement in long vowels (pre), academic status and measures of estimated engaged time over the A-B interval (subjects pooled, N = 66)	101

		Page
4.22	Achievement in long vowels (post) regressed on achievement in long vowels (pre), academic status and measures of estimated engaged time over the A-B interval (subjects pooled within class, N = 66)	102
4.23	Achievement in decoding (post) regressed on achievement in decoding (pre), academic status and measures of allocated time over the A-B interval (subjects pooled, N = 103)	105
4.24	Achievement in decoding (post) regressed on achievement in decoding (pre), academic status and measures of allocated time over the A-B interval (subjects pooled within class, N = 103)	106
4.25	Achievement in decoding (post) regressed on achievement in decoding (pre), academic status and measures of estimated engaged time over the A-B interval (subjects pooled, N = 72)	107
4.26	Achievement in decoding (post) regressed on achievement in decoding (pre), academic status and measures of estimated engaged time over the A-B interval (subjects pooled within class, N = 72)	108
4.27	Means, standard deviations and intercorrelations for achievement in reading and associated measures of instructional time assessed over the A-B interval	110
4.28	Speed in decoding consonant sounds (post) regressed on speed in decoding consonant sounds (pre), academic status, and measures of allocated time over the A-B interval (subjects pooled, N = 105)	112
4.29	Speed in decoding consonant sounds (post) regressed on speed in decoding consonant sounds (pre), academic status, and measures of allocated time over the A-B interval (subjects pooled within class, N = 105)	113
4.30	Speed in decoding consonant sounds (post) regressed on speed in decoding consonant sounds (pre), academic status, and measures of estimated engaged time over the A-B interval (subjects pooled, N = 77)	115
4.31	Speed in decoding consonant sounds (post) regressed on speed in decoding consonant sounds (pre), academic status, and measures of estimated engaged time over the A-B interval (subjects pooled within class, N = 77)	116
4.32	Summary of Results of Regression Analysis for Time Variables and Grade 2 Reading Achievement	117

LIST OF FIGURES

		Page
2.1	Teacher log format	20
2.2	Attendance/group composition record	21
2.3	Observation coding form	30

I INTRODUCTION

The overriding goal of the Beginning Teacher Evaluation Study is to identify teacher behaviors which are related to student learning. It seems clear from previous research that substantial relationships between teacher behavior and student learning are difficult to isolate, and even more difficult to replicate. Although many experiments have been conducted, the greater portion of this research has taken the form of correlational field studies. These studies attempt to characterize classroom phenomena in such a way that the amount of student learning can be predicted from or related to instructional variables.

The major problem has been to define and measure characteristics of instruction that are related to the amount learned. Large numbers of variables have been considered; see the Handbook of Research on Teaching (Gage, 1963), the Second Handbook of Research on Teaching (Travers, 1973) and The Study of Teaching (Dunkin & Biddle, 1974). The results of field studies for the vast majority of these variables have been inconsistent.

Regardless of the variables chosen to characterize instruction, it is clear that the instructional experiences of students differ in both kind and amount. Differences in the amount of instructional time students spend on a particular objective may be an important factor in understanding student learning. Before inquiring further about the relationship between teacher behavior and student learning, it is imperative to know whether students who receive more instructional time in a given subject area exhibit more learning in that area than students who receive less time. If time effects are large regardless of other

characteristics of instruction then the pattern of teacher time allocation must be carefully scrutinized.

In several studies, positive correlations have been found between amount of instructional time and student achievement, although the strength of this relationship has been difficult to assess. In a review of approximately 20 studies, David (1974) concluded that, in studies where the variation in exposure to schooling was extensive, there were consistent positive relationships between exposure to schooling and achievement scores. In studies where the variation in exposure to schooling was minimal, no consistent effects of exposure to schooling were found.

In a school-level analysis, Wiley (1973) calculated average amount of schooling by taking the product of length of school year, length of school day, and average daily attendance rate. Using this index, variation in amount of schooling was strongly and positively related to knowledge acquisition in both reading and mathematics. Another school-level analysis (Karweit, 1976) on the same data confirms this result. However, analyses on several other data sets (Karweit, 1976) failed to find positive effects for amount of instructional time.

Studies by Bond and Dykstra (1967), Harris and Serwer (1966), and Harris, Morrison, Serwer and Gold (1968), report negative correlations between teacher or student absences and achievement, which could imply that more instructional time is associated with higher achievement. Harris and Serwer (1966) found a positive relation between amount of time in reading instruction and reading achievement. Other studies (Carroll & Spearitt, 1967; Hess & Takanishi, 1974; Stallings, 1975; and Stallings & Kaskowitz, 1974) have assessed the amount of time

students actually engage in learning activities in a particular subject area. The results are not overwhelming, but in most cases positive associations were found between time and achievement.

The concept of learning for mastery (Bloom, 1968) assumes that time-to-mastery-level and learning are positively related. The research in mastery-learning has generated considerable support for such a relationship. Block and Burns (1975), reviewing studies done at the University of Chicago, found a positive relationship between time and achievement. When time was measured as time actively engaged and on-task, the relationship was described as very strong.

Comments by Shanker (1976) on a recent British study (Bennett, 1976) deal with the relationship between instructional time and student achievement. Although Bennett's primary objective was the examination of student achievement as a function of teaching style, an effect for time was found. Regardless of teaching style, students who spent more time studying a subject also had higher achievement in that subject.

The present brief and incomplete summary of empirical studies of the relationship between instructional time and student achievement reveals some inconsistency. When comparisons were made between instruction and no instruction, relatively consistent positive relations were found. When variablility in the amounts of instructional time were relatively small, or when indirect measures of time were used, the results were mixed.

The characterization of classroom instructional variables in terms of time variables has considerable appeal. Carroll (1963) first elaborated a model of school learning wherein many elements of the model were time variables. More recently, Harnischfeger and Wiley (1975) have proposed a model for the teaching/learning process in elementary schools

which partitions instructional time into various subject-areas and classroom-setting combinations. This latter model has guided the current investigation. Differences in the amount of learning exhibited by similar students are presumably a function of both the amount and kind of instruction they receive. (The choice of useful kinds of instruction for which to account is a crucial problem in conceptualizing classroom instructional phenomena.) If two groups of similar students are receiving precisely the same kind of instruction, and if mastery of the objectives has not yet been reached, then the group which spends more time on the task will out-perform the group which spends less. In other words, differences in learning will be attributable to variation in the amount of instruction, other things being equal. An implicit assumption here is that the learning rates for students are identical. If instruction is not identical for the two groups of students, then amount of learning is a function of the kind of instruction, as well as the amount of instruction.

In studies of the relative effectiveness of different kinds of instruction, these two sources of variance in learning have not always been taken into account. The relative importance of differences in learning time and kind of instruction are not at all clear. If kind of instruction is much more important than learning time in influencing learning, then one would expect to find consistent relations between learning and kind of instruction received. If the factors are about equally important, or if kind of instruction is less important than learning time, then the relation between learning and indices of kind of instruction would appear to be inconsistent when learning time is not accounted for.

Since the educational research literature on teaching indicates the latter situation, it is desirable to assess the effect of learning time before trying to establish relations between learning and kinds of instruction. The overall purpose of this study is to address this issue. Although we are ultimately interested in studying the effectiveness of various teacher behaviors and skills (indices of the kind of instruction), it is necessary first to assess the impact on learning of differences in learning time (amount of instruction).

In field research, it is not possible to separate completely amount of instruction from kind of instruction. In fact, the kind of instruction must be specified at some level before it is possible to discuss amount of instruction. Kinds of instruction might be defined on the basis of content, group size, teacher behaviors, materials used, social climate, or physical arrangements of the classroom, among others. The number of kinds of instruction is practically limitless. Our approach has been to define broad kinds of instruction, and to study the relationship between the amount of instructional time spent in these areas and student achievement.

Teachers allocate time to subject matter areas and, within these, to sub-areas. In Grade 2 reading, sub-areas might be decoding initial consonants, compound words, word meaning, comprehension, etc. The time a teacher allocates to a subject area sets an upper limit on the amount of in-school instruction a student may receive in that subject area.

Besides allocating instructional time to subject areas, teachers also determine a large number of classroom conditions which influence the time allocated to a particular subject area. In this study, three dimensions were used to define an instructional setting, each was seen

as a dichotomy. The facets were: adult involvement (adult directly involved/no adult directly involved), pacing (self-paced seatwork/ other), and group size (small group/large group). These three dichotomous setting variables combined to form eight setting types. Instructional time was allocated to subject areas and, within subject areas, to the eight instructional setting types.

Of the time allocated to a particular subject area, students spent some time engaged in on-task behavior and some time in off-task behavior. From the point of view of the subject area under consideration, this latter time can be thought of as unengaged time.

The general goal of this study was to describe reading instruction in terms of both the allocated and engaged time which students spent in each of the instructional settings for each content sub-area, and to relate instructional time to student achievement. More specific goals of the study are stated in the following research questions:

1. How are allocated and engaged time distributed over various content categories?
2. How is allocated time distributed over instructional settings?
3. Of the time allocated to a subject area, how much is engaged time?
4. What are the characteristics of teachers' reported records of allocated time?
5. Do students who have more time allocated to a particular subject area also show more learning in that subject area?
6. Do students who spend more engaged time in a particular subject area learn more in that subject area?

The study reported here is part of a larger research effort. The data available for analysis were part of a larger data set which was

collected during the continuation of Phase III-A of the Beginning Teacher Evaluation Study. The work undertaken in this part of Beginning Teacher Evaluation Study is described in Program Plan for the Continuation of Phase III-A (Far West Laboratory, 1975). As part of this program plan, data on instructional time were collected in both reading and mathematics subjects areas. The data from the two subject matter areas were analyzed separately. A "parallel" analysis of the mathematics data is the subject of Technical Report II-3: A Study of Instructional Time in Grade 2 Mathematics. The current report deals exclusively with an analysis of instructional time in reading.

In keeping with the goals of Phase III-A, an important function of these exploratory studies was to provide experience in collecting and analyzing data on instructional time. The information on time allocation and the utility of various data collection devices is intended to facilitate the design and conduct of Phase III-B of the Beginning Teacher Evaluation Study.

II DESIGN AND INSTRUMENTATION

Design

The objectives of this study were to describe the naturally occurring variations in allocated and engaged instructional time, and to relate these variations to variations in student achievement. No manipulation of classroom conditions or teacher behaviors was attempted. The strategy was simply to assess student achievement in a number of content areas on two occasions; once early in the fall and once late in the fall. In the intertest interval, records of allocated time were kept. The intertest period was chosen in such a way that a maximum interval was available without inconvenience to schools during the first two weeks of classes or the week preceding Christmas vacation. It was also necessary to have approximately ten days at the beginning of the school year for contacting teachers and instructing them in procedures for keeping records of allocated time. These practical time constraints determined that the first testing occasion (referred to as occasion A) take place during the first week of October, 1975. Records of allocated time were kept for eight weeks of instruction, after which the second testing (occasion B) was conducted during the first week of December, 1975.

In addition to the records of allocated time, data were collected on engaged time by direct observation. This procedure was carried out in two-thirds of the classes in the sample. The data on engaged time served two main purposes; first, it allowed estimation of the proportion of allocated time during which students were actively engaged; and second, it provided data for relating student engaged time to achievement.

For the second of these purposes, it seemed particularly important to assess engaged time over several successive days, rather than a sample of days. In this way, the engaged time in a particular subject area could be assessed relatively accurately. Therefore classes were observed for two weeks. In an attempt to create optimal conditions for the assessment of the relation between engaged time and achievement, additional achievement tests were administered at the beginning of the first observation day and at the end of the last observation day. These testing occasions are referred to as OA and OB respectively. The procedure provided 100 percent coverage by direct observation of in-school instruction for every student during the OA-OB period. Observation was carried out by two observers; therefore only two classes could be observed during any one two-week period. As a result, classes were observed in pairs during successive two-week periods within the A-B period.

In summary, all classes[1] were tested during the first week of October, 1975 (occasion A); allocated time records were kept for eight weeks; and then all classes were tested again during the first week of December, 1975 (occasion B). Engaged time for two-thirds of the classes was assessed by direct observation during a two-week period, with associated pretests and posttests (occasions OA and OB). The timing of the observation periods was staggered in such a way that pairs of classes were observed during the same two-week period. All observation was conducted between testing occasions A and B.

---

[1]The data set described here is a subset of the data collected during the continuation of Phase III-A of the Beginning Teacher Evaluation Study (Far West Laboratory, 1975).

Measures of Reading Achievement

The measures of reading achievement used in this study are a subset of the reading scales being developed by the staff of the Beginning Teacher Evaluation Study. Interim versions of scales[1] being refined for Phase III-B were used.

A relatively large battery of reading items were administered at occasions A and B. The battery contained 340 items grouped into approximately three dozen subscales each assessing achievement in a specific reading content area commonly taught at Grade 2 in California schools. Twelve subscales or combinations of subscales are analyzed in this report. The scales are labeled decoding-consonant sounds (speeded test), decoding-long vowels, decoding-consonant substitutions, decoding (total), context clues-form of word, context clues (total), word structure-compound words, word structure (total), word meaning-synonyms, comprehension-description, comprehension-description, conprehension (total), and reading (total). With the exception of the items in the compound words subscale, all items were of the multiple choice type. All items were group-administered. (Examples of items from the scales are included in Appendix A.) Identical items were administered at occasions A and B and the resultant scores were used in conjunction with time measures assessed over the intervening eight-week interval.

Internal consistency reliability coefficients and other descriptive statistics (sor scales used over the A-B period in the upper section of Table 2.1. In several cases the scales used for analysis in later

[1]The development history and data from pilot testing of the items are included in Technical Report III-1: Development and Refinement of Reading and Mathematics Tests for the Study of Reading and Mathematics Instruction in Grades 2 and 5 (Filby & Dishaw, 1975). For a description of further refinement of the tests through an analysis of reactivity using the current data set, see Filby and Dishaw, (1976).

Table A.1

Reliability coefficients[a] for reading subscales at each testing occasion

A - B INTERVAL

Scale	Number of Items	Occasion A N	Occasion A Mean	Occasion A S.D.	Occasion A α	Occasion B N	Occasion B Mean	Occasion B S.D.	Occasion B α
Decoding - Single Consonants (speeded test)[b]	5	150	3.7	1.5	0.66	136	4.3	1.3	0.70
Decoding - Blends and Digraphs (speeded test)[b]	19	144	6.9	6.1	0.89	136	10.1	6.7	0.89
Decoding - Consonant Substitutions	10	147	2.5	3.6	0.75	149	4.0	3.8	0.75
Decoding - Long Vowels (final e)[c]	12	147	6.7	4.9	0.75	149	7.8	5.6	0.78
Decoding - Long Vowels (digraphs)[c]	10	147	4.4	4.0	0.81	149	5.6	4.0	0.82
Decoding[d] (total)	134	142	59.6	33.0	0.97	135	72.4	33.1	0.97
Context Clues - Form of Word	10	147	1.8	3.2	0.68	149	2.3	4.0	0.75
Context Clues - (total)	30	147	8.5	9.2	0.89	149	12.2	10.5	0.90
Word Structure - Compound Words	10	150	4.2	4.8	0.82	136	6.5	4.5	0.84
Word Structure (total)	65	139	15.0	16.0	0.92	135	24.8	17.3	0.93
Word Meaning - Synonyms	18	148	3.6	5.2	0.82	144	5.4	6.4	0.86
Comprehension - Description	13	133	2.1	3.6	0.70	134	3.0	4.2	0.73
Comprehension (total)	50	138	9.5	12.5	0.90	134	15.1	14.7	0.91

OA - OB INTERVAL

Scale	Number of Items	Occasion OA N	Occasion OA Mean	Occasion OA S.D.	Occasion OA α	Occasion OB N	Occasion OB Mean	Occasion OB S.D.	Occasion OB α
Decoding - Long Vowels	22	117	12.1	7.8	0.89	112	11.4	8.0	0.89
Decoding	14	117	8.4	4.2	0.74	112	7.8	4.7	0.80
Compound Words	10	117	6.1	4.1	0.77	112	6.6	3.9	0.71

[a]Alpha coefficients (Cronbach, 1951) are presented for each scale.

[b]The scores on Decoding-Single Consonants (speeded test) and Decoding-Blends and Digraphs (speeded test) were added to form a scale named Decoding-Consonant Sounds (speeded test). The combined scores were used in subsequent analyses. All other subtests included in this report had liberal time limits.

[c]The scores on Decoding-Long Vowels (final e) and Decoding-Long Vowels (digraphs) were added to form a scale named Decoding-Long Vowels which was used in subsequent analyses.

[d]This scale included speeded subtests. The Decoding (total) scale used in subsequent analyses included 86 of these items (but no speeded items).

sections of this report do not correspond exactly to the scales listed in Table 2.1. These differences are briefly described below.

One speeded test (decoding-consonant scounds) was analyzed. This scale was created by summing scores on two speeded subtests (decoding-single consonants and decoding-blends and digraphs). Alpha coefficients for these two subscales are presented in Table 2.1. Similarly, scores on the two long vowel subscales (final e and digraphs) listed in Table 2.1 were summed to form one 22 item scale labeled decoding-long vowels which was used in subsequent analyses.

The decoding (total) scale in Table 2.1 included speeded items. The decoding (total) scale which is analyzed in later sections of this report contained 86 items, none of which were speeded items.

Later analyses also include a reading (total) scale formed by summing scores on 301 items. No reliability information for this scale is included in Table 2.1, however its length alone insures a very high internal consistency.

In addition to the test battery administered at occasion A and B, 42 items were administered at occasions OA and OB immediately before and after the direct observation period. The items administered at OA and OB represented three scales (decoding-long vowels, decoding, and compound words) which were also a part of the test battery given at A and B. Since the same scales were to be administered on four occasions in a relatively short time period, and since the scores from occasions OA and OB were to be analyzed independently of the scores from those given on occasions A and B, the items given on occasions OA and OB differed from those given on occasions A and B. The items were logically parallel, in that the stems and format were identical. The stimulus words and pictures

in about four-fifths of the items were changed to limit the possible effects of memory. The internal consistency reliability coefficients for each of the scales are displayed in the lower section of Table 2.1.

Entries in Table 2.1 were computed on all subjects with complete data for any given testing occasion. All scores were corrected for guessing using the standard correction procedure (Thorndike, 1971). Although some tests were short, the internal consistencies were relatively high.

Measure of Academic Status

The total scores on the reading battery (340 items) at occasion A was used as an index of academic status. Scores for academic status ranged from a low of 1 to a high of 322 for the students in this study. The mean and standard deviation were 107 and 81 respectively. No internal consistency reliability coefficient was available for the variable, but the value was certainly in excess of .95. Values of Cronbach's alpha (Cronbach, 1951) were available for three of the major subcomponents of academic status. For 128 decoding items, 65 word structure items, and 124 comprehension items, the Cronbach's alpha estimates were 0.96, 0.92, and 0.97 respectively. Since the components of academic status were highly correlated, it seems clear that the academic status measure had very high internal consistency. This measure, based on a wide variety of reading items, was used as an index of general academic aptitude in analyses relating instructional time and student achievement.

Process Variables

The process data consisted of measures of both allocated and engaged

time spent in particular reading content areas. Within content areas, several instructional settings were distinguished. Data were collected for every student in each of the participating classes. Allocated time was assessed by a log-keeping procedure and engaged time was assessed by direct observation. The present section of this report describes the subject-matter and setting categories, the teacher log procedure, and the direct observation procedure. The final portion of this section describes procedures used in deriving two alternative indices of student engagement.

Subject-matter and instructional setting categories. Since instruction is planned and implemented by content area, and since student achievement is most often differentiated by content area, instructional time was first partitioned by content category. Subareas of reading (e.g. decoding, word meaning, comprehending main ideas) constitute the categories. Reading content categories were developed at two levels; general and specific. They were derived from a logical analysis of Grade 2 reading objectives, textbooks, and curriculum materials. The original categories were modified and refined by classroom teachers during piloting.

For Grade 2 reading, 10 general content categories were defined. These break down into sixty-eight specific content categories.[1] (All content categories are listed in Appendix B.) Specific content categories were developed so that allocated time could be recorded in relatively narrow categories. However, it was not possible to use all of these categories in direct observation. As a result, the general

[1]The category systems had a primary use related to the study of test reactivity (Filby & Dishaw, 1976). For this purpose the categories were designed to encompass the entire Grade 2 curriculum.

content categories were also devised. In some cases, a general content category corresponds to one specific content category; in most, several specific categories make up one general category.

Within the content categories, broad instructional settings were defined by three fundamental instructional characteristics: adult involvement, pacing, and group size.

The teacher-involvement facet had two elements. Settings in which students worked directly with a teacher (or other adult) were distinguished from settings in which a teacher's primary attention was not directed toward the students being considered. This facet is important because the impact of a teacher's interactive behaviors and skills operates in the former but not the latter type of setting. (The term "teacher" was used in the broad sense, to include any adult directly involved in instruction.) If a class was divided into two groups at some point in time, and one of the groups was engaged in an addition drill with the teacher while the other group was doing seatwork, the students in the drill activity were in a setting with direct teacher involvement. The students who were doing seatwork were in a setting which did not involve a teacher directly, even though the teacher may have occasionally addressed one or more of them. If students were engaged in seatwork, and the teacher's main activity consisted of going from student to student to check or explain work, the teacher was characterized as directly involved, even though he did not interact with all students in the group.

The pacing facet was included to distinguish between settings in which students proceeded at their own pace and settings in which they worked at a pace determined by the teacher (or some other characteristic

of instruction). Pacing is very much a matter of degree; students never completely determine their own pace, nor is pace totally determined by external factors. Nevertheless, instructional settings vary considerably in this respect; and, as a result, the rate of student learning may be strongly affected. As a crude operationalization of pacing, a distinction was made between seatwork and group work. Seatwork is the most frequently occurring setting in which students have relatively high control over pace; group work is the situation which is most externally paced.

The third facet of instructional setting was group size. This facet has been the subject of much research and has great intuitive appeal. It was included here, not because of its potential direct effect on learning, but because different group sizes provide the opportunity for very different kinds of student activities, teacher behaviors, and group climates. The mere fact that a student is working in a small group does not imply that a particular kind of instruction will occur; it does act as a necessary (but not sufficient) condition for certain highly-valued teacher behaviors. For instance; the smaller the group, the more closely a teacher can approximate a tutoring situation with each student. However, a lecture to a group of five children is probably very much like a lecture to a group of thirty-five children. Group size, like the facets of setting, was coded as a dichotomy. Large groups were defined to contain ten or more students; small groups, nine or fewer. (Pilot experience showed that a lower value for the upper bound of "small groups" would have provided very little discrimination among actual classroom groups.)

Teacher logs. The teacher logs were developed by the staff of the Beginning Teacher Evaluation Study. The logs served as the primary

source for collecting data on allocated time, both for the study of instructional time and for the study of reactivity (see Filby & Dishaw, 1976). The development of practical methods for collecting information on allocated time was, in itself, an important objective of the work carried out during the continuation year of Phase III-A of the Beginning Teacher Evaluation Study.

The log procedures are the result of pilot work conducted in three year-round schools during July and August, 1975. A wide variety of procedures were considered, including many suggestions from participating teachers. The goal of pilot testing was to have teachers try a prototype log and, tapping their reactions and suggestions, to develop a workable format for acquisition of a maximum of accurate information with minimum inconvenience to the teacher. (Teachers recruited for the pilot tests were told that procedures were being developed for recording the content covered in reading and mathematics for each student in their classes. They were also told that the information would be used to relate student achievement to the content which had actually been covered during classroom instruction.)

The first log that was tried had a checklist format. Content categories were listed, and teachers were asked to indicate daily whether students had worked on the categories. Teachers recorded the amount of time, using the symbols N (not at all), S (from one to five minutes), and A (any time period greater than five minutes). A relatively detailed list of categories was included. If teachers felt that too many categories had been listed, they were asked to suggest categories which could be collapsed. In classrooms where teachers grouped students for instruction, logs were kept for student groups. Teachers with highly individualized

programs kept one log for each of four students. In the latter case, students were selected from the high, middle, and low quarters of the student-ability range. During the pilot period, teachers kept logs on both mathematics and reading instruction.

Six teachers (three 5th grade and three 2nd grade) from a year-round school in Hayward, California piloted this procedure for two weeks. As they had individualized programs, the logs were kept for target students. After two weeks, about half the teachers found that keeping logs of this type took from five to ten minutes per day. With more practice and greater familiarity with the content categories and the format, it was estimated that all teachers could complete logs in about ten minutes per day.

The procedure worked well in the Hayward program; however, it provided data on only four students per class. The teachers had several constructive comments. They found the content categories relatively familiar and easy to use. Most felt that the "N" notation was a waste of time and dropped it completely. A few noted some teacher benefits from keeping logs: it reminded them specifically of what they were or were not covering, and the students for whom logs were kept were pleased and motivated by the attention.

At this point, those teachers with highly individualized programs were asked to divide their students into three ability groups and to keep a weekly record of content covered for each group. They reported difficulty in grouping students. In addition, content categories which they noted as "covered" were not necessarily covered by all students in a particular group.

At an additional pilot site in Fairfield, California, teachers also

kept logs as described above. Here, two fifth grade teachers were involved in a team-teaching situation. Their classes were grouped by mastery level, and they found it convenient to keep the logs by student group. After these teachers had kept logs for approximately ten days, they were asked to augment the log to reflect instructional settings as well as content covered. At this point, it became clear that information on individual students was not necessary if the class were grouped. The teachers in Fairfield suggested a log format which was a variation of a lesson plan, rather than a checklist. This new format was tried and found to be workable. However, it was clear that the organization for instruction varied considerably from class to class, requiring that the procedure for log-keeping remain flexible.

As a result of experience in these classrooms, one procedure was developed for classes which used various grouping strategies, and another for classes that were highly individualized.

Teacher log procedure. The experience gained during the pilot was used to refine the record keeping procedures. All participating teachers maintained records of time allocated to reading instruction. These were referred to as "teacher logs." The logs provided information on content covered and settings for reading instruction, on a daily basis, for groups of students in each class. The time allocated to each instructional setting was recorded, with one or more content categories associated with that setting. In highly individualized classes, teachers recorded the content covered and settings used for each student during reading instruction.

The teacher log format is presented in Figure 2.1. Each one-page log covered one week of instruction for a single group of students. The names

TEACHER _____ GRADE _____ READING _____ MATH _____ GROUP _____ WEEK _____

TIME:

MONDAY	CONTENT	
	Adult / No Adult and Seatwork / Other	
	MATERIAL	
TUESDAY	CONTENT	
	Adult / No Adult and Seatwork / Other	
	MATERIAL	
WEDNESDAY	CONTENT	
	Adult / No Adult and Seatwork / Other	
	MATERIAL	
THURSDAY	CONTENT	
	Adult / No Adult and Seatwork / Other	
	MATERIAL	
FRIDAY	CONTENT	
	Adult / No Adult and Seatwork / Other	
	MATERIAL	

Figure 2.1
Teacher Log Format

Figure 2.2

ATTENDANCE/GROUP COMPOSITION RECORD

READING MATH (circle one) Teacher_____ Grade_____

Week of_____

Student's Name	Group	M	T	W	Th	F
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
25.						
26.						
27.						
28.						
29.						
30.						
31.						
32.						
33.						
34.						
35.						

of the students in a given group were designated on the attendance/group composition sheet (shown in Figure 2.2). Each teacher listed his class roster on the left hand side of the attendance/group composition form. For a given week, the teachers then designated the reading instruction group for each student and the daily attendance. This procedure allowed for different grouping patterns in reading and mathematics when logs were being kept for two subject matter areas. It also allowed for changes in the composition of student groups.

Reading content was recorded according to the list of categories in Appendix B. Teachers referred to the list to find appropriate codes for content categories that best described the instruction. Teachers were also provided with glossaries which contained examples of each of the content categories, and were individually trained in the log-keeping procedure. Practice logs were kept by each teacher for up to two weeks before data collection began. The training and glossary were intended to ensure reliable categorization of content from teacher to teacher. Content was recorded using the specific content categories.

In classroom situations, content tended to change more quickly than setting. For this reason, several content categories were often designated for one instructional setting. The starting and ending time for each setting was recorded, thereby providing a record of the instructional time allocated to the content covered in each setting. If several different categories were recorded for one setting, (and therefore one time period), the the teacher specified the time devoted to each content category whenever possible. Otherwise, the total period of time was divided by the number of content categories, yielding an estimated time allocated to each category.

The defining characteristics of instructional settings (adult involvement, pace, and group size) have been described above. Direct involvement of an adult covered a range of activities from lecturing to monitoring independent seatwork. "Adult" referred to any teacher, student teacher, or aide. The same adult was not classified as directly involved in more than one setting at a time. Therefore, an adult would not be classified as directly involved in monitoring seatwork if that were a secondary function of the adult.

Regarding the pacing facet: "seatwork" referred to any setting where students worked independently. Two or more students working together, or an adult tutoring one student, was classified as a group-work setting.

The group size facet was not recorded by teachers. This categorization was made by coders when the teacher logs were returned to the Laboratory for processing. Group size was ascertained by checking the number of students in a particular group on the attendance/group composition form.

In addition to the information noted above, teachers provided a brief description of the materials used in each instructional setting: the name of a textbook and the pages covered, worksheets used for seatwork assignments, and the like.

In summary: for a given week, each teacher recorded how students were grouped for reading instruction on the attendance/group composition form. Daily absence records were kept on the same form; and if group composition changed during the week, the changes were also reported. On the teacher log form itself, teachers kept daily records for each student group. For each day, time periods were blocked off by vertical lines (drawn by the teacher). The beginning and ending times for a

setting were recorded along the top of the form. For each setting, teachers recorded adult involvement, pacing, materials, and content categories. In this way, varied instructional patterns could be recorded on the same form. (Examples of completed teacher logs and attendance/ group composition sheets are included in Appendix B.)

Where teachers grouped students for instruction, this procedure worked well. However, where instruction was highly individualized, variations were adopted. This most often required the keeping of records for individual students; or, where teachers operated a number of "activity stations," records could be kept for each station.

Since the log procedures were quite new, relatively little was known before the study about their measurement characteristics. Therefore, in order to obtain independent assessments of allocated time, two additional data sources were used. First, Far West Laboratory coders, who transferred the raw teacher logs into machine-punchable formats, spent one day in each classroom. During that day, the coders completed a log for the reading instruction that occurred. This log was then available for comparison with the teacher log for the same day. Since there was only one day of coder log per teacher, these data were treated in a clinical manner. Second, at the end of each day of direct observation, the Far West Laboratory observers completed logs. From this data source, seven to nine days of logs were made available for comparison with each teacher's log. The results of these comparisons are presented in Chapter IV.

Direct observation. Data collection by direct observation served two major purposes. First, direct observation of instruction over a two week intertest period provided the basis for relating achievement to amount of engaged time. Observation of all school instruction during

this interval eliminated the problems arising from sampling of a few instructional occasions from a relatively long intertest interval. The observation system was intended to capture all instruction relevant to reading in terms of engaged time in content and setting categories, which could then be related to achievement measures. The second purpose of the observation system was to provide independently collected data to compare with the allocated time data from teacher logs. However, since observers assessed engaged time and teachers reported allocated time, quantitative comparison of these two sources (for purposes of determining the reliability of teacher logs) was difficult. So, in addition to their daily observation task, observers completed an allocated time log of the day's instruction. These were used for comparison to the teacher logs.

In the development of this observation system, the selection of the level of specificity with which to describe classroom phenomena was a difficult problem. The usefulness and practicality of a content- or setting-category can vary tremendously depending upon the number of facets involved in its definition. The more specific the categories, the more difficult the coding of process data, especially when data are to be collected on every student in a given classroom. A decision must be made to collect either more specific information for a smaller number of students or less specific information on a larger number of students.

In this case, the decision was made to describe instructional settings at a relatively global level, in terms of three dichotomous facets (adult involvement, pacing, and group size). Within these settings, content was noted in relatively specific categories. (The setting facets and content categories have been described above. Although data were collected for both reading and mathematics instruction, only the data pertaining to

reading instruction are used for this report.)

During July and August, 1975, Far West Laboraotry staff observed teachers of Grades 2 and 5 in year-round schools operating in Fairfield and Hayward, California. On this occasion, attempts were made to code content in reading and mathematics in a large number of specific categories. It soon became clear that content changed very quickly when specific categories were used. For example, teachers handed out seatwork dittos which included work on a relatively large number of specific reading content categories. Clearly, it was impractical to record the amount of time spent on each specific category by each student.

After trying several alternatives, this problem was resolved by redefining the content categories. Since the observation covered a two week period in the fall of the year, attention was restricted to a few specific content categories which were commonly taught during that portion of the school year. The other content areas were collapsed into one broad category. The observation categories chosen for reading were:

1. decoding-long vowels,
2. other decoding,
3. word structure-compound words,
4. other word structure,
5. context clues, word meaning and comprehension
6. reading practice,
7. areas related to reading.

The relationships among the specific, general, and observation content categories are shown in Appendix B.

Focusing on a small number of content categories made observation much more practical, but did not solve all problems. Experience during piloting indicated that content still changed more quickly than setting variables (for example, group size or adult involvement). Rather than attempt a perfect fit between content categories and the setting variables,

more than one content designation was allowed for any particular combination of setting descriptors. These setting descriptors (adult involvement, pacing, and group size) were identical to those used in the teacher logs.

Some illustrations of how settings were coded may help to clarify the meaning of the setting descriptors. Consider the adult involvement setting facet. Suppose a teacher has his or her class divided into two activity groups: a reading circle led by the teacher, and a group of students doing seatwork. For all of the students in the reading circle, the instructional setting is characterized by the direct involvement of the teacher, while the setting for the remainder of the students entails no direct teacher involvement, and would be so coded. The status of the second group would not change even if the teacher occasionally answered questions for students in the seatwork group. However, if the whole class was doing seatwork, and the teacher's primary activity was monitoring students for the purpose of giving feedback and explanation, then the setting would be coded as having a teacher directly involved. In many classes, student-teachers and aides also engaged in direct instruction of students, and for coding purposes no distinction was made between these adults and "teachers." The adult-involvement setting facet was coded by using "A" to represent cases where the teacher was directly involved and "N" for all other cases.

Instructional settings were also differentiated in terms of pacing. A distinction was made between situations where each student controlled the pace at which his work proceeded and situations where the student did not. The vast majority of cases where the student has relatively high control of his own pace occurred in independent seatwork. Pacing

was operationalized as seatwork (coded "S") and everything else (coded "O").

In addition, settings were differentiated in terms of group size. Small groups (coded "L") were defined as having nine or fewer students. Settings with ten or more students working on the same activity were designated as large groups (coded "H").

The basic strategy of the system was to code all instruction in reading (and mathematics) for each student in a classroom. This was done by tracking the time students engaged in particular settings in terms of teacher involvement, pacing, and group size, and subsequently coding the content covered within each setting. (For each setting, one or more content categories were recorded.)

Experience during piloting indicated that one observer could monitor classes of up to thirty students for this information. However, it was essential that the observer know the general routine of the classroom, the materials, and also be able to distinguish one student from another rapidly. These requirements were met by having an observer spend one full day in a class before data collection began. This procedure allowed teacher and students to become accustomed to the observer, and provided the observer with practice in each classroom.

Direct observation procedure. Observers collected data over two consecutive weeks in each classroom. One day was required for memorization of the students' names, and familiarization with the general classroom routine. The remainder of the time (approximately 9 days) was available for official data collection.

Once the observer was familiar with the classroom organization and students, the procedure was relatively straightforward. The observer

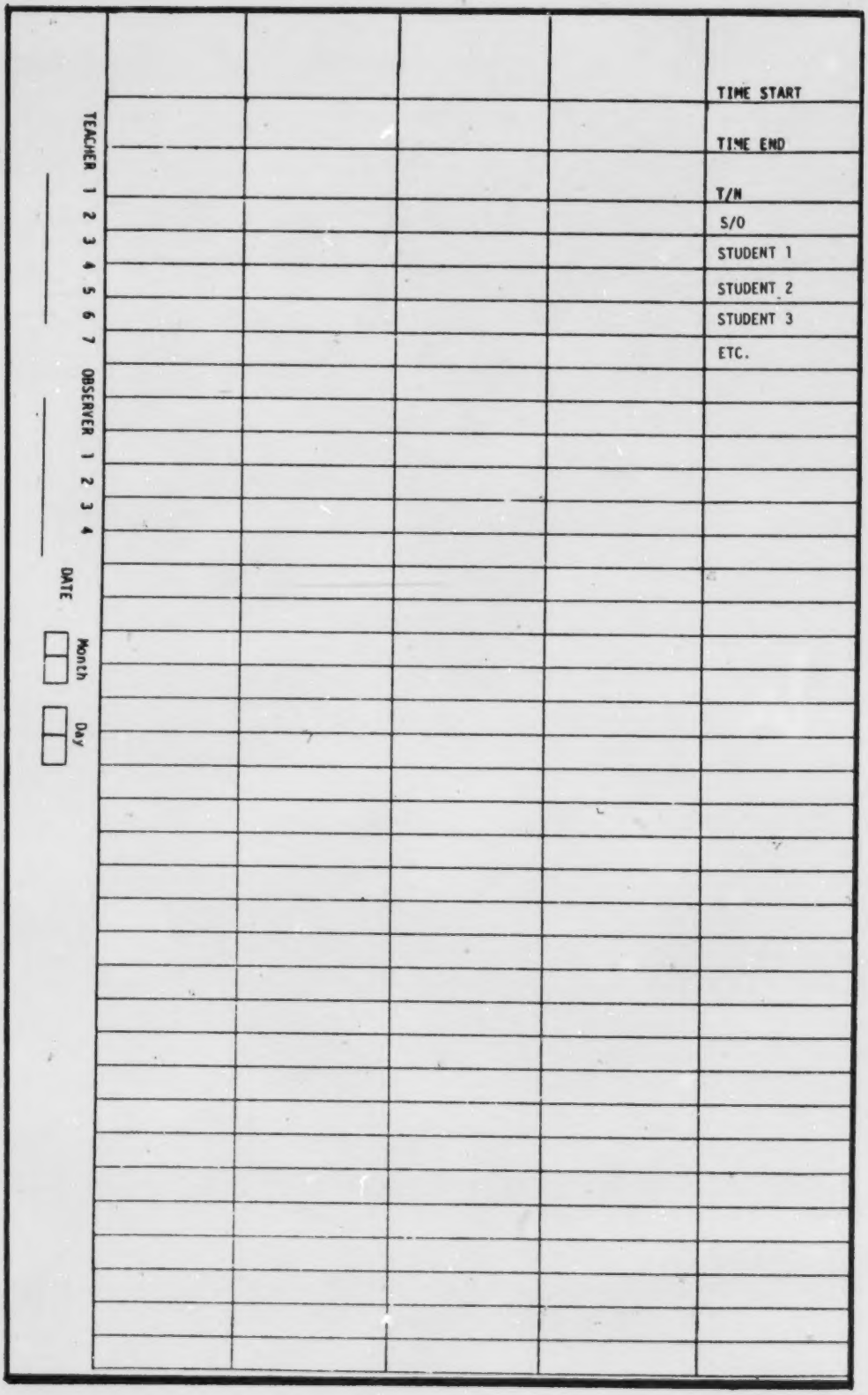
entered the classroom with the students each morning and used the observation coding form (Figure 2.3) to record data. (The coding form used in the field was 8-1/2 inches by 14 inches. It has been reduced in size for display in Figure 2.3.) Students' names were placed in the columns. The four lefthand columns were used for recording starting and ending times, teacher involvement and pacing codes.

The form was used in the following way. The observer noted the starting time for any group setting wherein reading (or mathematics) was the content. All times were recorded to the nearest minute. Teacher involvement and pacing for each group were then coded in the appropriate columns. Finally, the content was coded in the cell below the name of each student in that setting.

If the content was the same for all students in a setting, then the content was coded for the student appearing first in the list; and a horizontal line was drawn across the appropriate cells for each of the other students in that group. This indicated that the content code was the same for all students in that group. In the simplest case, where a setting came to an end at a particular time for the whole group, the ending time was recorded. If some students in that setting covered different categories of content, then those categories were coded under the names of the appropriate students. If one or more of the students in a setting left that setting, then the end time was entered in the cell for that student directly under the content code. In this way, all students who started out in the same setting could leave it at different times and still be accounted for. If a student entered an existing setting after it started, then the observer coded that student's start time under his name and then coded the content. Thus, if a cell for a

Figure 2.3

Observation Coding Form
(Reduced from 8-1/2" X 14")



particular student began with a time, it was implied that the group time entered in the far left column did not apply to that student. If the last entry in a cell for a particular student was a time, it implied that he left the group before it ended and the end time for the setting (second column from left) did not apply for that student. Similarly, if a student started off in setting A, changed to setting B, and then returned to setting A again, the sequence could be coded. The cell under the student's name might contain a content code, a time, another time, a content code, and a third time. This configuration would represent a case where the student started the setting with the whole group and was working on the content listed first. This work continued until the first time listed in his cell, at which point the student changed to another setting. At the second time listed in the cell, the student returned to the first setting and worked on the content listed next in the cell. The final time recorded in the cell represents the point at which the student left the setting again, and, in the example being considered, the setting continued to exist after the student's second departure. The time during which the student was not in the setting being discussed could be accounted for by looking in another row on the form (that is, in another setting). However, note that if the interim setting did not involve reading (or mathematics), then no entry would have been made for that interval.

To recapitulate: each row on the form represented a setting as defined by teacher involvement and pacing. Several rows could be active at any one time. Content and information which was associated with individual students (as opposed to groups) was recorded in the columns of the form under the names of the particular students. In this way,

one observer kept track of all the students in the class. Note that when a student was working on content which was not recordable within one of the categories of reading (or mathematics) as defined for this study, no codes were recorded.

Group size was not necessarily included in the set of codes. However, the group size for any setting could be recovered from the codes already described. For a particular student at a particular time, group size for the setting could be determined by examining the row in which the student was included and counting the number of students in the row at the same point in time. (As previously stated: for purposes of analysis, group size was considered a dichotomy; small groups defined as having nine or fewer members, large groups as having more than nine. Since the exact group sizes were available from the raw data, this cutting point could be easily changed for additional analyses.)

The space at the right of the sheet was used for comment or clarifications as they were required. Forms with the names of students were printed for each class. The names of teacher and observer and the date of observation were also recorded on each form.

In carrying out the observation routine, it was necessary for the observer to move about the room to look at materials being worked on by students. Experience showed that the content coding required a thorough knowledge of the materials actually being used by students. This was especially true in cases where the program was highly individualized.

The observation procedure was designed to collect information on engaged time. If students were not engaged in the task at hand, then time was subtracted from each setting for each student depending upon how much time that student was unengaged. When time was subtracted for

unengagement, it was done so in multiples of one minute; momentary inattention was ignored.

Engagement was judged by the observer with the aid of several guidelines. When students were working on tasks which required an overt response, engagement was relatively easy to judge. When students were working on tasks which did not involve overt responses, the situation was somewhat more difficult. In the latter cases, observers used student eye contact and body position as indicators of engagement. If a student was in a discussion group, watching the various speakers in turn and apparently following the discussion, then the time was considered engaged time. If a student was discussing an unrelated topic with other students, or was clearly not attending to the task, then the time was considered unengaged time. The distinction was fairly crude; students were considered unengaged only when the situation was unambiguous.

At the end of each observation day, the raw data on the observation coding form were transferred to standard coding booklets by the observer. In this way, a set of engaged times was generated for each student, describing his reading (and mathematics) instruction for the day. For reading, with seven observation content categories and eight combinations of the three dichotomous setting variables, there are 56 content-by-setting combinations. The standard coding booklets contained a vector of 56 engaged time entries for each student, summarizing the engaged time in reading for that particular day. The observation data on this form were punched on computer cards for further processing.

Observer reliability. The observation data were collected by two observers. After approximately two weeks of training, the observers simultaneously collected data in two classrooms over a four day period for reliability

purposes. Both observers went to Class A for two full days and then to Class B for two full days. The data obtained in this period were transferred to the standard coding booklet; and times were collapsed over days, classes and setting codes, so that total engaged times were available for each student for each content category from each of the two observers. Interobserver correlations were computed, and showed good agreement on most content categories.

After this post-training check, the observations were carried out in the study classrooms. This required approximately six weeks. Following the data collection, the observers returned to the same two classes and simultaneously observed Class A for 2 days and Class B for one day.

These data were processed along with those collected at the post-training period. The data were collapsed over the seven days (four pre and three post) of observation, yielding total time in content-by-setting combinations for each student from each observer.

The interobserver correlations for each content-by setting combination are presented in Table 2.2. For the calculation of interobserver agreement indices, the students from both classes were pooled, yielding a sample of 45 students. Some setting-by-content combinations were rarely (or never) observed during the seven day period. This resulted in some correlations being calculated on distributions with very little variance. In some cases only one student had a non-zero engaged time. This accounts for many of the low correlations. Where the distributions were all zeros for both observers, two dashes appear in the table. These represent cases of perfect agreement; that is, neither observer recorded any time for any student in that content-by-setting combination. Where

Table 2.2

Interobserver correlations for content category by setting combinations. Data were collected in two classrooms over a total of seven school days. Four of the days occurred after training but before the study data were collected, while three of the days occurred after the study data were collected.

	OBSERVATION CONTENT CATEGORIES						
Setting Combinations	Long Vowels (RL)	Other Decoding (RD)	Compound Words (RC)	Other Word Structure (RS)	Combined Comprehension (RM)	Reading Practice (RP)	Areas Related To Reading (RO)
ASH	.55	.45	.40	.30	.85	.89	.82
ASL	-.04[a]	.43	.00[a]	-.05[a]	-.04	.41	-.06[a]
AOH	1.00	.93	--	--	.93	1.00	1.00
AOL	.99	.62	--	.00[a]	.23	.69	1.00
NSH	.00[a]	--	--	.00	.00	.92	--
NSL	--[b]	.16[a]	--	--	.08[a]	.22	-.06[a]
NOH	--	--	--	--	--	--	--
NOL	--	1.00	--	--	--	-.12	--
All Settings Combined	.95	.91	.63	.94	.85	.64	.97

Note Number of subjects = 45

A = adult directly involved
S = seatwork
L = low group size
N = no adult directly involved
O = other (non-seatwork)
H = high group size

[a] These coefficients represent cases where only a few students had non-zero times assessed by one or both observers. Seven of the coefficients had between five and eight students with non-zero times, while the others had three students with non-zero times.

[b] a -- indicates perfect agreement between observers but all students had zero recorded time.

there was a reasonable amount of time recorded, the correlations were relatively high, indicating that engaged time in content-by-setting combinations can be reliably recorded by different observers.

The setting information was used for descriptive purposes only. Time in content areas was used both for descriptive purposes and in analyses of time in content with achievement. The bottom row of Table 2.2 presents the interobserver agreement when the data were collapsed over setting. Note again that the coefficients were relatively high.

Student engagement rates. Although the direct observation procedure provided information on the amount of engaged time students spent in a two week instruction period, there was no direct information available on student engagement rates. Two methods of estimating engagement rates were tried.

As noted earlier, observers completed a log at the end of each day of observation. This log contained the amount of allocated time in reading (and mathematics) for students in the class for a particular day. These daily logs were coded and punched. (Reading logs and mathematics logs were punched separately.) For most classes, there were seven full days of instruction for which both allocated time from observer logs and engaged time from direct observation were available (one class had six days). For each student, the total time allocated to reading and the total engaged time in reading were calculated (over the 6 or 7 day period). An observed engagement rate was then computed for each student by taking the ratio of total engaged time in reading to total time allocated to reading.

Since the observed engagement rate could be computed only after extensive observation of each student, it was desirable to find an alternative procedure that would be less expensive. The results of this work were to inform the Beginning Teacher Evaluation Study Phase III-B design, so cost and practicality considerations were important.

An alternative procedure was based on adjusted teacher ratings of student attentiveness. Teachers were asked to rate each student in terms of the percent of the time which the student paid attention during class. These ratings were made twice: once for instructional settings where an adult was directly involved, and once for settings where no adult was directly involved. The percent attentiveness ratings were made by placing a check in one of nine categories, where each category represented an increment of 10 percent on a 0 percent to 100 percent scale. (The directions to teachers and the two rating forms are included in Appendix C. By an oversight, the category representing 31 to 40 percent was omitted from the form.)

The teacher ratings of attentiveness were assigned the mid-category value; that is, a check in the 81-90 percent category was assigned a value of 0.85. This provided a distribution of attentiveness scores for each class. However, comparison from one class to another would be hazardous, since errors due to teachers' tendencies to rate high or low would appear as between-class differences. In an attempt to correct for possible teacher bias, class estimates of mean engagement were made.

The estimates were based on data collected during instruction in reading. An observer visited each class for one day. During the reading instruction periods, the observer counted the number of students engaged and the total number of students nominally working on reading. This

procedure was repeated every four minutes. In this manner, average class engagement estimates were calculated. The results of this procedure are shown in Table 2.3.

These average class engagement estimates were used to adjust the teacher ratings of student engagement. The adjustment was made in such a way that each adjusted class mean was equal to the average class engagement estimate. The adjustment is specified in the following equation:

$$Y_{ij} = \frac{\overline{E_j}\, R_{ij}}{\overline{R_j}}$$

where Y_{ij} is the adjusted teacher rating of attentiveness for student i in class j, R_{ij} is the teacher rating of student attentiveness, $\overline{R}_j$ is the class mean of the teacher ratings of student attentiveness for class j, and $\overline{E}_j$ is the mean class engagement estimate for class j. This procedure prevents Y_{ij} from being negative, and preserves the relative ranking of students within class.

Sample

The field work carried out by Far West Laboratory during the continuation year of Phase III-A of the Beginning Teacher Evaluation Study (see Far West Laboratory, 1975) involved a sample of 33 teachers. This sample was composed of 16 Grade 5 and 17 Grade 2 teachers. Each volunteered to participate in the one-year study.

The teachers were recruited in the San Francisco Bay Area by Far West Laboratory staff during the spring of 1975. After meetings with

Table 2.3

Estimates of average class engagement during reading instruction for eight[a] Grade 2 classes.

Class	Average Number of Students Observed	Number of Time Samples	Time Sample Interval (Mins.)	Average Engagement[b]
1	15	18	4	.44
2	11	44	4	.49
3	19	27	4	.25
4	7	41	4	.59
5	15	23	4	.41
6	16	31	4	.51
7	13	33	4	.55
8	7	38	5	.50

[a] Although there are nine classes in the sample, this procedure was carried out in classes 1 through 8. No data are available for class number 9.

[b] These estimates were calculated from one day of observation per class. In all cases data were collected during class time which was allocated to reading activities. Since teachers allocate varying amounts of time to reading, the time period covered by the observation differs considerably. The observers counted the number of students engaged at four minute intervals (with one exception). They recorded the number of students engaged, the time, and the number of students in the classroom who were part of the BTES study and who were nominally working on reading activities. The average engagement was calculated by summing the number of students engaged over the total number of time samples and dividing by the sum of the number of students in the classroom being followed by BTES and nominally working on reading activities. No distinctions have been made between setting combinations or subareas of content within reading.

administrative officials and building principals in ten districts, individual teachers were contacted. The study was described, and teachers were offered extension credits (through a cooperating college) or an honorarium for their participation.

In September of 1975, it was decided to conduct the reading and mathematics studies with separate samples of teachers. The teachers at both grade levels chose to participate in either the reading or the mathematics sample.

The study being reported concentrated on the Grade 2 reading subsample, which consisted of nine teachers. Given practical and financial constraints, it was not possible to carry out extensive direct observation in all classes. As a result, six of the Grade 2 reading classes were selected for direct observation. Selection for the observation subsample was made on the basis of variety of instructional organization across classes and representation of inner city, suburban, and mixed populations. All of the teachers selected agreed to be included in the observation subsample. Since the direct observation required observers to be present for the entire school day, it was feasible to collect information on both reading and mathematics instruction. As a result, this subsample was treated as a regular part of the Grade 2 reading sample; but, in addition, several mathematics scales were administered to the classes, and teachers kept logs of both reading and mathematics instruction. This report deals only with the reading data collected from the nine teachers.

Teachers in this study completed a remarkable amount of work in connection with the study. (The work reported here is based on data collected over approximately 10 weeks of instruction during the fall

of 1975; the teachers continued to contribute to other facets of the Beginning Teacher Evaluation Study through the spring of 1976.) Each teacher received either a $50 honorarium or four extension credits for participating in the study. They were paid $10 per week for the completion of teacher logs (kept over a period of approximately 12 weeks). Teachers who were observed for a two-week period were given an additional honorarium of $100.

The nine classes represented a variety of background characteristics. Five classes served a relatively lower class inner-city population, two served a mixed population, and two served middle class suburban areas. No two classes were in the same school, and the schools represented four different school districts in the San Francisco Bay area. The reading curricula in the classes varied widely. Seven of the nine classes relied on basal readers as the core of the reading program (four classes used the Harper and Row series; one class used the Lippincott series; one class used both the Harper and Row and Lippincott series; and one class used the Lippincott and Ginn series). Most of these classes had more than one level of a particular series in use at any given time. The levels varied from pre-primer to second grade as designated by the publishers. One of the classes using the Harper and Row materials augmented the program with substantial amounts of listening and silent reading. Each day students in this class listened to tapes (with earphones) while "reading along" in their books.

Two of the classes did not use basal readers. One of these used a "controlled reading" program produced by Educational Development Laboratories. This program prescribes sequential activities in word recognition, word meaning and general comprehension. Workbook materials

and "readers" were used in conjunction with a number of specially designed audio visual machines.

The other non-basal-reader program was highly individualized. Several "stations" presented reading related tasks to students. There were phonics activities to be completed in workbooks as well as auditory discrimination tasks carried out on special machines. A major portion of the reading program was conducted via filmstrips and audio tapes. Students were frequently tested before moving to new segments of the material. In addition students spent time in silent reading from a wide variety of books.

The teachers were all female, with several years experience in teaching. One of the teachers had no prior second-grade teaching experience, although she had had experience at other elementary school grade levels.

Several of the classes were split grades, containing some Grade 1 students and some Grade 2 students. Only Grade 2 students (but not necessarily all Grade 2 students in a given class) were included in the study. Of the Grade 2 students in a class, teachers were asked to identify those who were reading at a level below the middle of Grade 1. Since the low reading level would have made it difficult to test these students reliably, they were not tested, nor were they followed via the log procedure. At the initial testing, it became clear that several other students were not able to complete the tests. These students were also dropped from the study. This left 152 students in nine classes as the student sample available for analysis.

III THE COLLECTION AND ANALYSIS OF DATA

Data Collection

The data collected in the nine Grade 2 classes are summarized schematically in Table 3.1. This report deals only with the reading data. The eight-week test data were comprised of the scores obtained from testing occasions A (first week of October) and B (first week of December). The teacher log data describe the reading instruction for the A-B intertest period. The two-week test data were comprised of scores obtained on testing occasions OA and OB. For Classes 1 and 3, this period fell in the latter half of October. For the remaining two pairs of classes, (numbers 4 and 5 and numbers 2 and 6), the OA-OB interval came during the first and last two weeks of November respectively. The direct observation data and observer log data describe reading instruction during the OA-OB interval.

At occasions A and B, the reading battery was administered in four 45 minute group testing sessions. The four sessions required 2 testing days. Tests were administered by Far West Laboratory staff, but not by the observers. No other tests were given on the same day. At the OA and OB occasions, short mathematics and reading tests were administered in one 45-minute session. This testing was administered by the observers. All test administrators were briefed on the testing procedure, and approximately half of the testers administered at least one of the tests in a classroom practice session before testing began. Those test administrators who did not have a practice administration acted as observers at least once while a test was being administered to a class. The guidelines for test administration are included in Appendix A. Test

Table 3.1

Summary of data collected on nine Grade 2 classes.

Class	2 week observation data	2 week test scores	8 week log data	8 week test scores	8 week attitude data	2 week observer logs	1 day coder logs	1 day coder estimate of mean class engagement	teacher ratings of student attentiveness
1	R,M	R,M	R,M	R,M	R,M	R,M	R	R	R
2	R,M	R,M	R,M	R,M	R,M	R,M	R	R	R
3	R,M	R,M	R,M	R,M	R,M	R,M	R	R	R
4	R,M	R,M	R,M	R,M	R,M	R,M	R	R	R
5	R,M	R,M	R,M	R,M	R,M	R,M	R	R	R
6	R,M	R,M	R,M	R,M	R,M	R,M	R	R	R
7			R	R	R,M		R	R	R
8			R	R	R,M		R	R	R
9			R	R	R,M		--[a]	--[a]	R

Notes

R represents reading data; M represents mathematics data.

[a] The one day coder log and the coder estimate of mean class engagement were not obtained for class 9.

administrators completed testing report forms (see Appendix A) after every administration, and were debriefed after testing occasions A and B.

The testing conditions were, on the whole, reasonably good. There were, however, the usual number of unexpected interruptions. At the A testing occasion, the tests proved difficult for many students and, caused frustration for some. Items with unfamiliar terminology or symbols which could have caused reading difficulties were read to the students by the test administrator. Care was taken to have the teachers present in the classroom, to conduct the testing sessions at the same time of day, and to adhere to time limits developed during pilot testing. These precautions (and many others listed in the training materials) were intended to reduce measurement error; however, the difficulty of conducting field testing over several occasions (even in a small number of classes) is not to be underestimated.

Student responses were made directly on the test booklets. The completed booklets were returned to the Far West Laboratory for processing. Some hand-scoring was required, after which the item responses were punched on cards and verified. Scoring was done by a computer routine, and the standard correction for guessing was applied. Item analyses were conducted, and internal consistency reliability coefficients calculated.

Data collection for the teacher logs began early in September with one-to-one meetings with each participant. Materials on log-keeping were explained, and teachers began to keep practice logs up to two weeks before the A testing occasion. Each teacher was visited several times so that any questions about log keeping could be answered. The amount of feedback which teachers required varied considerably. The more complex

the organization for instruction was, the more complicated the log-keeping became.

Once the class rosters were finalized and teachers had some practice, the log-keeping seemed to go smoothly. Teachers were asked to complete their logs each day, and to return them to the Far West Laboratory by mail every Friday. This procedure worked quite well, although teachers were sometimes late in returning logs, and it is not certain that all teachers completed them every day.

When logs were returned to the Far West Laboratory, they were visually checked and given to a coder who transferred the information onto standard coding sheets. The log for any given day was coded as a series of events, where each event was defined by a content code, the setting codes, and the time allocated to that event. Events were associated with particular students, so that a student's reading instruction for the day appeared as a series of events. All of the logs were punched by student by day. Given that a student typically had four or five events per day, and that the sample of 152 students was tracked by logs for approximately 40 days, the management of the log data was a challenging task.

Once all of the logs were coded and punched, two types of validity checks were carried out. First, the number of days represented for each student was checked to make sure that all the days in the A-B interval were accounted for. This task was done by hand, using the raw logs and absentee information to edit any discrepancies. In addition, for one student in each class, the number of events on the computer printout was handchecked against the raw logs. This was done to insure that students

had the correct number of events. Besides the handchecking procedures, range tests were made by the computer.

When the log data had been checked and cleaned in this manner, allocated times were accumulated over days. This generated a vector of times (in minutes) for each student representing the distribution of allocated reading time for that student in the categories formed by all possible content-by-setting combinations. For reading, there were a total of 544 categories (8 setting combinations by 68 specific content categories). At this stage there were 152 students with complete log data. Therefore, the fundamental log data matrix was 152 rows by 544 columns, where the entries were total allocated time for the A-B testing interval. By aggregating over columns of this matrix, it was possible to generate allocated time by settings, allocated time by general content categories, etc. The time data used in the A-B analyses of instructional time and student achievement were based on this matrix.

The accuracy of the teacher logs was investigated by comparing data from teacher and observer logs. A second aggregation of the teacher log data (over the days in the OA-OB interval) was made for this purpose. This aggregation was carried out for only six of the nine teachers since only six had been observed.

The observer logs were processed in a manner similar to the teacher logs. In this case, the reading instruction was coded by general content categories only, thus making the fundamental matrix for observer logs 112 rows (representing the students in the six observed classes) by 80 columns (8 setting combinations by 10 general content categories). The allocated times in this matrix represented instruction over a seven-day period within the OA-OB interval.

Data collection for the direct observation procedure began with arrangements with the teacher for a two week period for observation. At this time, the observer obtained an outline of classroom routine and discussed the nature of the observation with the teacher. It was made clear to the teacher that information on engaged time in instruction for individual students would be collected, and that no data on teacher behavior were being recorded. The OA and OB testing was discussed, and teachers were told what scales would be administered. In addition, teachers were asked to spend time on instruction in decoding long vowels. This request was intended to ensure that all students would have at least some time in a common content category. It was desirable to have significant amounts of engaged time in one or more time categories; otherwise it would be difficult to demonstrate growth in achievement over a two-week period.

On the first observation day, the observer memorized the names of students who were to be observed, and became familiar with classroom routine. During this day, the observation procedure was practiced in this new setting, and teacher and students had time to become accustomed to the observer. Every day during the observation period, the observer entered the class with or before the students and remained for the entire school day. This allowed the coding of all instruction relevant to reading (and mathematics). On the second day of the observation period, the OA testing was administered by the observer. Immediately after the testing, observation data collection began and continued during in-school hours until the OB testing date.

During the post-reliability check for the observation procedure, several errors in transferring times from raw observation coding forms

to standard coding booklets were discovered. The post-reliability data were completely checked and any errors corrected. This situation raised questions about the transfer process for the study data. As a result, a random sample of the study data was recoded. For each teacher, two days were randomly selected from the set of observation days. The corresponding raw observation data were recoded. This was done for both the reading and mathematics data; 26 of the 104 booklets (representing 25 percent of the data) were recoded. In this sample, 76 errors were found in a total of 1746 entries. This corresponded to a 4 percent error rate. The errors varied in size. When all errors were combined, the total number of minutes (regardless of sign) was 365.6. The average error had a magnitude of 4.8 minutes. The errors discovered in this sample were corrected before further processing of the observation data. Given that some of the errors would "cancel out," that the errors were distributed over a relatively large number of students, and that the average error was small, transfer and coding errors in the observation data were of minor importance.

The observed engaged times were aggregated over days, generating a 112-row by 56 column matrix (7 observation content categories by 8 setting combinations). These data were aggregated twice; once over all days between the OA and OB testing, and once over the OA-OB period minus the days on which the testing actually took place. The latter aggregation was used for comparison with the observer logs and the subset of the teacher logs which had been aggregated over the identical days.

Analysis

The results presented in the next chapter are divided into three

sections: characteristics of teacher log data, description of time allocated to reading content- and setting-categories, and analysis of instructional time and reading achievement. This section summarizes the procedures used in arriving at those results.

The data on teacher log characteristics are presented descriptively. Each class was treated separately and within-class correlations are presented between teacher log times and observer log times. No significance testing has been carried out on these data.

The time-allocation data are presented in summary form. In the main, class means and standard deviations are shown. No statistical comparisons have been made on these data.

The section on time and learning was more problematic. The objective of analyses in this section was to show whether or not students who spend more time in a particular content area also show higher levels of achievement in that content area. The analyses undertaken assumed that posttest achievement level was a function of pretest achievement level, general aptitude for school learning and the amount of instructional time spent on the subject area. Multiple regression analysis was selected as the procedure for analyzing the data. In this analytical framework, the questions of major interest became "Is the raw regression weight for time positive?" and "Is that weight bounded away from zero?" (A positive regression weight indicates that more time is associated with more learning. However, weights are of relatively little interest, if a typical confidence band around the regression weight includes zero.)

One way to proceed would have been to conduct analyses within each class, since the other instructional conditions for members of the same

class were reasonably homogeneous. In the current data set, this would have required running analyses on very small samples ranging in size from 13 to 26. Such analyses could hardly be expected to yield stable results.

The procedure used instead required two separate steps. First, all subjects were pooled regardless of class membership, and multiple regression analyses were conducted. A substantial positive regression weight for time was interpreted as meaning "more time/more learning," but the source of the effect was somewhat ambiguous. It could have resulted from differences among classes (but no differences among students within the same class), differences among students within the same class (but no differences among classes), or both. At this point, class means were plotted to help clarify the ambiguity. If no effect for time was found, a within-class relationship remained possible.

Regardless of the results of this first step, a second step was carried out. Scores on each variable were transformed to deviations from their respective class means, and the regression analyses were rerun on the deviation scores. This procedure is described by Cronbach and Webb (1975).

A substantial positive regression weight for time on the second step was interpreted as follows. Students with more time have higher levels of achievement regardless of class mean differences. No effects on both steps would indicate that, for this sample and for this model specification, instructional time was not linearly related to achievement.

Analyses carried out in the first step of this procedure are referred to as "analyses with subjects pooled." Those carried out in the second

step are referred to as "analyses with subjects pooled within class."

Specifying which variables to include in the regression model was somewhat difficult. In each case, academic status was used as a measure of aptitude. The major time variable was defined as the time in the content category which matched the content assessed by the achievement test. In most cases, a second time variable was included representing time in a logically related area of instruction. As a general rule, analyses of achievement over the OA-OB period include engaged time measures from direct observation. Analyses of achievement over the A-B period have been carried out twice: once using allocated time estimates from the teacher logs, and once using adjusted allocated time obtained by multiplying the allocated time from the teacher logs by the observed engagement rate. Throughout this report, this adjusted time is referred to as "estimated engaged time (from teacher logs)."

Each regression run was made on cases with complete data. The reading tests were relatively easy resulting in substantial ceiling effects. To reduce these effects, the pretest score distribution was examined and several cases trimmed, so that each student (after trimming) had the opportunity to gain at least as many score units as were gained by the sample as a whole. Trimming (to provide complete data and reduce ceiling effects) was carried out as a routine procedure. The ceiling effects in the data were serious. In the most severe case fifty percent of the sample was trimmed before analysis.

IV RESULTS

Results are presented in three general areas: characteristics of teachers' allocated time logs, allocations of instructional time to reading, and relations between instructional time and student achievement. Time variables are reported in minutes unless otherwise noted. Achievement scores are reported in raw score units where, in each case, the scores have been corrected for guessing.

An overview of time allocated to reading is presented in Table 4.1. Some comments on this table may clarify the conditions under which data were gathered and facilitate the understanding of later tables. Note that class size averaged 28 students, and that in most classes only a portion of the total class was included in the Beginning Teacher Evaluation Study data collection. Data were available for a total of 152 students in the nine Grade 2 classes.

The number of days of instruction in the A-B testing interval ranged from a high of 40 days to a low of 28 days (see Table 4.1). This variation did not affect the time-and-learning analysis, since all relevant in-school time between pre- and posttest was accounted for. However, the discrepancy does cloud between class comparison of allocated time. This problem could have been avoided by the reporting of time per day or time per student-day; but this would give the impression that time was allocated to every sub-content area on a daily basis, which was not true. Therefore, in the time-allocation section of this chapter, times are reported for a 40-day instructional period; and for classes where the actual A-B interval was less than

Table 4.1

Class size, length of school day, adult instructional time, and time allocated to reading for nine Grade 2 classes.

Class	Total class size	Number of students included in BTES	Number of days instruction in A-B interval	Length of school day for students (minutes)	Number of paid aides	Instruction time provided by paid aides (mins./day)	Total adult instruction time (mins./day)	Average minutes per student per day allocated to reading instruction	Proportion of school day allocated to reading instruction
1	30	16	40	255	1	180	435	87.8 (5.8)[a]	.34
2	28	18	37	240	0	0	300	108.8 (6.1)	.45
3	29	20	37	250	2	330	580	94.9 (7.7)	.38
4	30	14	34	235	1	160	395	70.8 (6.0)	.30
5	26	26	37	250	1	240	530	60.7 (14.7)	.24
6	27	18	38	255	1	150	405	93.3 (6.5)	.37
7	26	14	32	260	1	180	440	97.2 (9.2)	.37
8	31	13	32	240	1	45	340	103.3 (6.1)	.43
9	27	13	28	240	1	180	480	150.0 (8.4)	.63
Average of class values (unweighted)	28	17	35	247	1	163	434	96.3	.39

[a] Values in parentheses are standard deviations computed within each class.

40 days, times have been adjusted proportionately. All of the allocated time information was taken from the teacher logs kept over the A-B period.

The length of the school day for a student varied by as much as 25 minutes depending upon which class he attended. The times recorded are in-class times, minus times for lunch and recesses. Since some classes operated on a staggered-day routine, where part of the class came early and went home early while a second group came and went home late, the length-of-school-day figures do not necessarily reflect the amount of student contact-time for teachers. (Class 2 clearly illustrates the effect of the staggered day. Note that a student in Class 2 spent 240 minutes in daily instruction, but that the teacher instructed students for 300 minutes per day.) The total amount of adult instructional time reported in Table 4.1 was calculated by summing the in-class time for all paid adults in the classroom. The preceding column indicates how much of this adult instructional time was contributed by paid aides. The algebraic difference between the two adult time columns equals the instructional time spent by the classroom teacher. Although the adult time figures were difficult to interpret for any particular student, at the class level it was clear that quite different amounts of adult instructional time were allocated to different classes. Within this small sample, Class 3 reported 77 percent more allocated adult time than did Class 2. The figures in the table do not account for adult instructional time which may have been provided by volunteers, nor has any non-instructional support time been considered.

The average number of minutes allocated to reading instruction per student per day was calculated by summing all allocated time in

reading over the A-B period and subsequently computing the average over days and students within each class. From Table 4.1, the average amount of time allocated to reading varied by as much as a factor of 2.4 from one class to another. Note also that there was some variation in time allocated to reading within a particular class, and that this variability changed from class to class. The variability within class represents differential student absence rates as well as differential allocation patterns across students within a class.

Since the within-class standard deviations were quite small, it appears that the amount of time allocated to reading for a particular child was determined by his class membership; and that (allowing for absenteeism) students in the same class were allocated approximately the same amount of time in reading. The final column in Table 4.1 reports the mean allocated time in reading per student per day as a proportion of the total instruction per school day.

Characteristics of Teacher Allocated Time Logs

The teacher logs provided measures of allocated time over the A-B period. At a practical level, the procedure proved workable. Teachers were able to use the content and setting categories, and to keep records of time allocated to various kinds of instruction. The procedure was also flexible enough to allow data collection in very different classroom organizational structures.

Comparison of the teacher logs with observer logs provided information on the accuracy of the recorded allocated times. The observer logs had been completed at the end of each school day during the OA-OB period.

This task was a secondary priority for the observers, since all of their in-school time was taken up with direct observation; and after school hours, their primary task was the transference of direct observation data from the observation coding form to the standard coding booklets.

The allocated time logs completed by the observers differed from the teacher logs in at least two important ways. First, observer allocated time logs recorded content at the level of general content categories, while the teachers' logs used specific content categories. This mismatch prevented the comparison of allocated time within all of the specific content categories, but did allow comparison of allocated time within the general content categories.

Second, the observer logs were coded for content using a strategy referred to as "focus coding." This required that an instructional activity be placed in one particular content category, if possible -- the most complex category which described the activity. (Comprehension would be coded as "comprehension," and not as part comprehension and part decoding, even though decoding is part of the comprehension process.) When contents were covered in sequence, each was coded with its appropriate allocated time, but where contents were coextensive in time, the more complex content was coded. This focusing on one content category was used in direct observation and hence carried over into the coding of the observer allocated time logs.

The teacher logs, on the other hand, used a strategy referred to as "multiple coding" for categorizing content. In this procedure, teachers were encouraged to use more than one content code, if it improved the description of the activity. In processing the logs, if an instructional

activity received more than one content code for a time interval, the time was distributed equally over the content codes. The same activity can be coded quite differently, depending upon whether focus coding or multiple coding is used.

In spite of these differences, the observer logs were the best source of information for checking the accuracy of teacher allocated time logs. Tables 4.2 through 4.7 present comparative data on observer and teacher logs. Each table presents information on one teacher. Only six tables are reported since only six of the nine teachers were observed. The tables are identical in format. These tables deal only with the content information and, for the moment, ignore the setting information in the log data. Since the last part of this chapter presents time and learning results, the content characteristics of the logs were given first priority.

The tables are based on teacher logs, observer logs, and direct observation information for days when all three sources were available for a given class. Table 4.7, describing the log characteristics for Class 6, is based on data from six days of instruction. The tables for the other five classes are each based on information from seven days of instruction.

The rows of each table are labeled by general content category. Note that rows 2,4, and 10 represent subtotals for decoding, word structure and comprehension respectively. The last row presents total time in general content categories 1 through 9. The entries in column A are allocated times from the teacher logs. Column C presents allocated time from the observer logs. Information in all general content categories was included for columns A and C, since the logs provided this information.

Table 4.2

Means, standard deviations, and correlations for Class 1 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation. These data are summed over seven days of instruction for which all three sources of time information were available. (N = 16)

Class 1

Content Category	A Allocated Time from Teacher Logs	B Adjusted Allocated Time from Teacher Logs	C Allocated Time from Observer Logs	D Engaged Time from Direct Observation	r_{AC}	r_{AD}	r_{BD}
Long vowels (GCC 1)[a]	30 (15)	13 (7)	40 (27)	24 (23)	.63	.85	.87
Total decoding (GCC 1,2)	262 (75)	122 (63)	256 (65)	176 (40)	-.77	.42	.32
Compound words (GCC 4)	58 (31)	24 (14)	2 (3)	19 (35)	.24	.85	.67
Total word structure (GCC 4,5)	126 (43)	55 (23)	47 (24)	59 (41)	.30	.96	.69
Reading practice (GCC 9)	121 (14)	53 (16)	431 (57)	71 (20)	-.48	.00	.19
Other reading (GCC 8)	6 (11)	2 (4)	69 (35)	27 (12)	-.96	-.80	-.72
Context clues (GCC 3)	56 (20)		140 (58)		.89		
Word meaning (GCC 6)	33 (6)		13 (8)		-.84		
Comprehension of text (GCC 7)	26 (16)		107 (23)		-.50		
Total comprehension (GCC 3,6,7)	114 (7)	50 (17)	260 (81)	76 (43)	-.06	-.07	.39
Total reading (GCC 1 through 9)	629 (53)	282 (104)	1062 (148)	410 (85)	.67	.70	.42

[a] General content category numbers are shown in parentheses.

Table 4.3

Means, standard deviations, and correlations for Class 2 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation. These data are summed over seven days of instruction for which all three sources of time information were available. (N = 18)

Class 2

Content Category	A Allocated Time from Teacher Logs	B Adjusted Allocated Time from Teacher Logs	C Allocated Time from Observer Logs	D Engaged Time from Direct Observation	r_{AC}	r_{AD}	r_{BD}
Long vowels (GCC 1)[a]	8 (11)	4 (6)	13 (16)	4 (5)	.98	.82	.83
Total decoding (GCC 1,2)	254 (52)	124 (28)	188 (48)	104 (35)	.97	.74	.73
Compound words (GCC 4)	1 (1)	0 (1)	2 (3)	3 (5)	1.00	.91	.91
Total word structure (GCC 4,5)	17 (19)	9 (9)	11 (11)	14 (15)	.98	.91	.92
Reading practice (GCC 9)	118 (33)	58 (18)	88 (37)	132 (44)	.56	.69	.56
Other reading (GCC 8)	85 (21)	41 (11)	44 (16)	25 (12)	.69	.51	.47
Context clues (GCC 3)	7 (9)		0 (0)		.00		
Word meaning (GCC 6)	0 (0)		0 (0)		--[b]		
Comprehension of text (GCC 7)	81 (26)		17 (9)		.30		
Total comprehension (GCC 3,6,7)	88 (23)	42 (10)	17 (9)	21 (11)	.57	.29	.31
Total reading (GCC 1 through 9)	562 (110)	273 (60)	348 (86)	296 (89)	.95	.84	.76

[a] General content category numbers are shown in parentheses.

[b] A -- indicates perfect agreement between sources of time information however there was no variance on either variable.

Table 4.4

Means, standard deviations, and correlations for Class 3 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation. These data are summed over seven days of instruction for which all three sources of time information were available. (N = 20)

Class 3

Content Category	A Allocated Time from Teacher Logs	B Adjusted Allocated Time from Teacher Logs	C Allocated Time from Observer Logs	D Engaged Time from Direct Observation	r_{AC}	r_{AD}	r_{BD}
Long vowels (GCC 1)[a]	77 (10)	19 (6)	100 (9)	38 (4)	-.35	.30	.55
Total decoding (GCC 1,2)	223 (21)	55 (15)	295 (52)	106 (18)	.53	.41	.29
Compound words (GCC 4)	38 (18)	9 (4)	24 (6)	11 (4)	.55	.23	.47
Total word structure (GCC 4,5)	39 (18)	9 (4)	24 (6)	12 (4)	.57	.38	.59
Reading practice (GCC 9)	267 (36)	66 (19)	175 (30)	49 (12)	.29	.16	.57
Other reading (GCC 8)	46 (41)	12 (12)	5 (7)	2 (0)	-.75	.00	.00
Context clues (GCC 3)	0 (0)		0 (0)		--[b]		
Word meaning (GCC 6)	0 (0)		0 (0)		--		
Comprehension of text (GCC 7)	120 (62)		38 (54)		.98		
Total comprehension (GCC 3,6,7)	120 (62)	31 (20)	38 (54)	16 (20)	.98	.96	.93
Total reading (GCC 1 through 9)	695 (79)	172 (51)	537 (60)	184 (27)	.94	.65	.81

[a] General content category numbers are shown in parentheses.

[b] A -- indicates perfect agreement between sources of time information however there was no variance on either variable.

Table 4.5

Means, standard deviations, and correlations for Class 4 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation. These data are summed over seven days of instruction for which all three sources of time information were available. (N = 14)

Class 4

Content Category	A Allocated Time from Teacher Logs	B Adjusted Allocated Time from Teacher Logs	C Allocated Time from Observer Logs	D Engaged Time from Direct Observation	r_{AC}	r_{AD}	r_{BD}
Long vowels (GCC 1)[a]	20 (17)	13 (12)	27 (20)	6 (10)	.74	.71	.64
Total decoding (GCC 1,2)	90 (33)	54 (25)	186 (53)	195 (52)	.48	.45	.39
Compound words (GCC 4)	23 (7)	14 (5)	9 (1)	13 (3)	.04	.25	.44
Total word structure (GCC 4,5)	23 (7)	14 (5)	16 (3)	13 (3)	.04	.39	.53
Reading practice (GCC 9)	143 (35)	84 (28)	184 (50)	127 (69)	-.18	.13	.35
Other reading (GCC 8)	8 (11)	5 (7)	73 (41)	40 (35)	.67	.49	.55
Context clues (GCC 3)	7 (11)		0 (0)		.00		
Word meaning (GCC 6)	65 (24)		0 (0)		.00		
Comprehension of text (GCC 7)	57 (30)		96 (30)		-.23		
Total comprehension (GCC 3,6,7)	129 (52)	78 (36)	96 (30)	37 (16)	-.06	.24	.23
Total reading (GCC 1 through 9)	394 (90)	235 (79)	554 (104)	412 (79)	.66	.55	.63

[a] General content category numbers are shown in parentheses.

Table 4.6

Means, standard deviations, and correlations for Class 5 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation. These data are summed over seven days of instruction for which all three sources of time information were available. (N = 26)

Class 5

Content Category	A Allocated Time from Teacher Logs	B Adjusted Allocated Time from Teacher Logs	C Allocated Time from Observer Logs	D Engaged Time from Direct Observation	r_{AC}	r_{AD}	r_{BD}
Long vowels (GCC 1)[a]	10 (9)	5 (5)	0 (0)	3 (5)	.00	-.16	-.11
Total decoding (GCC 1,2)	73 (29)	31 (15)	83 (34)	45 (30)	.68	.41	.12
Compound words (GCC 4)	0 (0)	0 (0)	6 (6)	4 (11)	.00	.00	.00
Total word structure (GCC 4,5)	16 (26)	7 (11)	26 (9)	20 (15)	.34	.09	.11
Reading practice (GCC 9)	114 (50)	45 (18)	141 (48)	55 (25)	.99	.76	.47
Other reading (GCC 8)	16 (15)	8 (8)	37 (17)	17 (11)	.65	.59	.58
Context clues (GCC 3)	14 (9)		0 (0)		.00		
Word meaning (GCC 6)	14 (15)		0 (0)		.00		
Comprehension of text (GCC 7)	70 (50)		127 (33)		.33		
Total comprehension (GCC 3,6,7)	98 (44)	43 (24)	127 (33)	80 (24)	.55	.19	.22
Total reading (GCC 1 through 9)	318 (64)	132 (48)	414 (64)	217 (46)	.29	.37	.01

[a] General content category numbers are shown in parentheses.

Table 4.7

Means, standard deviations, and correlations for Class 6 on allocated time from teacher logs, adjusted allocated time from teacher logs, allocated time from observer logs, and engaged time from direct observation. These data are summed over six days of instruction for which all three sources of time information were available. (N = 18)

Class 6

Content Category	A Allocated Time from Teacher Logs	B Adjusted Allocated Time from Teacher Logs	C Allocated Time from Observer Logs	D Engaged Time from Direct Observation	r_{AC}	r_{AD}	r_{BD}
Long vowels (GCC 1)[a]	32 (21)	18 (14)	19 (5)	18 (22)	.90	.47	.56
Total decoding (GCC 1,2)	201 (32)	103 (43)	166 (49)	79 (26)	.66	.34	.31
Compound words (GCC 4)	1 (6)	1 (4)	2 (7)	1 (3)	1.00	-.06	-.06
Total word structure (GCC 4,5)	3 (8)	2 (5)	18 (12)	6 (7)	.94	.03	.03
Reading practice (GCC 9)	97 (21)	51 (21)	46 (27)	24 (10)	.30	.22	-.09
Other reading (GCC 8)	49 (18)	26 (13)	8 (8)	7 (7)	.35	.33	.48
Context clues (GCC 3)	3 (7)		0 (0)		.00		
Word meaning (GCC 6)	17 (16)		0 (0)		.00		
Comprehension of text (GCC 7)	5 (6)		186 (58)		.14		
Total comprehension (GCC 3,6,7)	24 (19)	11 (10)	186 (58)	66 (31)	.24	-.20	.05
Total reading (GCC 1 through 9)	373 (65)	192 (77)	423 (79)	182 (42)	.94	.47	.71

[a] General content category numbers are shown in parentheses.

Columns A and C provide the basic comparison for allocated time. Column D presents engaged time from direct observation. Since the direct observation system used one content category to cover general content categories 3, 6 and 7, some rows in column D are blank. Allocated times from the teacher logs were multiplied by the adjusted teacher ratings of student attentiveness. This product, referred to as "adjusted allocated time (from teacher logs)" is presented in the tables as column B.

The purpose of calculating the adjusted allocated time was to allow comparison with the engaged time from direct observation. Therefore, column B presents data in only those rows (general content categories) for which engaged time from direct observation was available. Columns B and D then allow a comparison of measures of adjusted allocated and engaged time from independent sources. In addition to comparison of means and standard deviations, three sets of Pearson product-moment correlation coefficients were calculated. The first, r_{AC}, describes the relation between the two sources of allocated time. The second, r_{AD}, describes the relation between allocated time from teacher logs and engaged time from direct observation. Finally, r_{BD}, represents the degree of relationship between adjusted allocated time and engaged time.

A simple summary of Tables 4.2 through 4.7 is difficult but several comparisons do shed some light, for example, the comparison of allocated time from teacher logs and from observer logs. The means in columns A and C for rows 1 through 10 did not agree consistently; for some rows they seemed to agree quite well for others they did not. No class had agreement in all rows, but there were several content categories where most classes agreed. In the main, these were categories where relatively

little time had been allocated. Of the 60 average differences in columns A and C (6 classes by rows 1 through 10), 25 were less than 15 minutes in magnitude and 32 were less than 30 minutes in magnitude. Note that rows 1 and 2, rows 3 and 4 and rows 7, 8, 9 and 10 are not independent. Therefore some of the "disagreements" between the means of columns A and C were counted twice. In any case there were many large average differences.

The differences between columns A and C for class 1 (Table 4.2) appeared to be larger than those for the other classes rendering the log data from class 1 less usful than that from other classes. Considering all of the classes, there were several examples of miscategorization while in other cases pieces of the reading program have been included by the observer but not by the teacher or vice versa. These comparisons reflect a number of sources of error. One was the use of the different coding strategies for the two data sources. (Teacher logs were coded using the multiple coding strategy, while the observer logs used focus coding.) Amount of error due to coding strategy differences as compared to other sources of error is unknown. Class 5 (Table 4.6) demonstrates this difficulty. Note that, in this table, the means in columns A and C match quite well, with the exception of general content categories 3, 6 and 7. However, note too that the sum of general content categories 3, 6 and 7 for column A (98 minutes) is in moderate agreement with the corresponding sum for column C (127 minutes). In this case, the observer log (which used focus coding) allocated all of the time in question to comprehension of text, while the teacher log (using multiple coding) distributed the time (over context clues, word meaning and comprehension of text.

The variance within class in time allocated to reading (over 40 days of instruction) was moderate; that is, students in the same class tended to get more or less similar amounts of time allocated to reading. Differences among students within the same class on total time allocated to reading were due in large part to absenteeism.

The content categories function as a partially ipsative set -- the amount of time in any one category was not independent of the time in the other categories. Furthermore, an error in one category tended to cause errors in one or more additional categories.

For total times allocated to reading, relatively large differences between sources of data were found. Note that when allocated time was summed over content categories, coding strategy differences no longer had an effect. With the exception of class 1, the correlations between columns A and C were moderate to high.

The correlation between the two sources of allocated time data accumulated over general content categories provided a reasonable summary description for the classes. Within five of the classes (1, 2, 3, 4, and 6), the students were ranked similarly on amount of allocated time from the teacher logs and from the observer logs. The correlations for these classes were 0.67, 0.95, 0.94, 0.66, and 0.94 respectively. For Class 5 the correlation was 0.29.

Upon examination of the correlations between allocated time from teacher logs and engaged time from direct observation, several interesting findings emerged. First, for Class 5 (which had poor overall agreement between the two sources of allocated time), the value of r_{AD} was 0.37. For the five classes where the two sources of total allocated time

agreed reasonably well within class, r_{AD} was approximately equal to r_{AC} for three classes (1, 2 and 4), and was substantially lower than r_{AC} for the others (Classes 3 and 6).

Turning now to the comparison of adjusted allocated time from teacher logs and engaged time from direct observation: the differences in the means in columns B and D were considerably smaller than those described for columns A and C. In this case, 23 of 42 comparisons within general content categories (represented by rows in Tables 4.2 through 4.7) showed means differing by less than 15 minutes. Agreement across classes was good for long vowels, compound words and total word structure. An important question was whether the allocated time from teacher logs or the adjusted allocated time from the teacher logs was more highly correlated with the engaged time from direct observation. A comparison of r_{AD} and r_{BD} shows that in three classes (3, 4 and 6) the adjusted allocated time from teacher logs was more highly correlated with engaged time from direct observation. For each of these classes the improvement was substantial. However in two of the remaining three classes (1 and 5) the decrease in the relationship brought about by the adjustment procedure was also substantial. So, in this sample, the characteristics of the allocated time from teacher logs were improved in three of the classes but not improved in the other three by the adjustment procedure. Since the teacher ratings were not clearly successful in a majority of the classes, no analyses of instructional time and achievement were conducted using them.

Allocation of Instructional Time in Reading

The data on allocated time from the teacher logs, accumulated over

the A-B interval (approximately 8 weeks), provide a summary record of how time was spent during reading instruction in the nine Grade 2 classes. (The log data were far from being error free and, as a result small differences in allocated times do not warrant interpretation.)

Table 4.8 illustrates how mean time allocated to reading (as reported in the teacher logs) was distributed by content subarea for the A-B testing interval. The general content categories make up the columns of this table. During the A-B period, teachers allocated about one third of their reading instruction to decoding and about one quarter to areas related to reading (see Appendix A for content included in GCC 8). Approximately one tenth of the time was allocated to each of comprehension, reading practice and the miscellaneous categories. The patterns of allocation differed considerably from class to class. Class 1 had a high allocation of time to word structure and Class 9 had high allocations to both reading practice and the miscellaneous category. No category was consistently omitted nor were the categories rank ordered similarly within class. With very few exceptions the variation between classes was greater than that within classes.

The distribution of time allocated to reading over the specific content categories is presented in Table 4.9. Although the allocation pattern among classes was quite complex, teachers generally tended to allocate substantial amounts of time to the same specific content categories. There were, of course many exceptions. For example, only Class 1 allocated a large amount of time to specific category 3 (decoding-variant consonants); Class 9 allocated a large amount of time to specific content category 59 (grammar); and only Class 4 did not

Table 4.8

Means and standard deviations for time allocated to general content categories in reading for nine Grade 2 classes. The entries are class averages reported in minutes per student accumulated over 40 days of instruction.

Class	Decoding (GCC 1,2)	Content Clues (GCC 3)	Word Structure (GCC 4,5)	Word Meaning (GCC 6)	Comprehension (GCC 7)	Areas Related to Reading (GCC 8)	Reading Practice (GCC 9)	Miscellaneous (GCC 10)	Total Time Allocated to Reading (GCC 1 through 10)
1	1401 (173)	200 (41)	629 (210)	187 (39)	207 (49)	604 (37)	170 (32)	112 (31)	3510 (232)
2	1610 (166)	26 (29)	109 (97)	3 (5)	411 (112)	1055 (117)	614 (37)	522 (42)	4350 (244)
3	1225 (81)	126 (12)	103 (26)	76 (20)	474 (149)	1272 (164)	106 (44)	414 (54)	3797 (206)
4	618 (211)	126 (104)	71 (22)	277 (62)	597 (176)	948 (181)	129 (44)	68 (24)	2833 (241)
5	773 (422)	82 (50)	277 (182)	74 (57)	366 (188)	593 (159)	87 (53)	177 (89)	2428 (588)
6	1285 (159)	82 (37)	190 (56)	254 (126)	82 (79)	728 (123)	291 (52)	820 (57)	3733 (261)
7	1058 (94)	179 (53)	171 (85)	114 (41)	567 (88)	1139 (105)	354 (82)	305 (59)	3886 (368)
8	1543 (214)	110 (60)	111 (77)	130 (47)	361 (38)	935 (132)	570 (64)	374 (34)	4132 (245)
9	1672 (339)	314 (66)	357 (217)	190 (63)	355 (53)	538 (36)	1309 (71)	1263 (93)	5999 (336)
Average of class means (unweighted)	1243 (368)	138 (84)	224 (178)	145 (90)	380 (163)	868 (264)	403 (391)	451 (382)	3852 (1009)

Notes

These data are based on teacher log reports prorated for 40 days of instruction. The row totals correspond to 40 times the average minutes per student per day allocated to reading instruction reported in Table 4.1.

Standard deviations are shown in parentheses.

Table 4.9

Means and standard deviations for time allocated to specific content categories in reading for nine Grade 2 classes. The entries are class averages reported in minutes per student accumulated over 40 days of instruction.

	DECODING													CONTEXT CLUES					
Class	SCC 1	SCC 2	SCC 3	SCC 4	SCC 5	SCC 6	SCC 7	SCC 8	SCC 9	SCC 10	SCC 11	SCC 58	SCC 14	SCC 15	SCC 16	SCC 17	SCC 18	SCC 19	SCC 20
1	106 (100)	74 (10)	129 (55)	236 (26)	151 (20)	110 (65)	138 (131)	84 (42)	19 (12)	43 (6)	143 (79)	168 (44)	0 (0)	53 (29)	70 (8)	42 (7)	22 (3)	11 (7)	3 (4)
2	10 (3)	163 (27)	17 (13)	226 (36)	35 (24)	28 (17)	8 (8)	16 (17)	0 (0)	0 (0)	11 (11)	1088 (60)	9 (8)	0 (0)	26 (29)	0 (0)	0 (0)	0 (0)	0 (0)
3	200 (26)	59 (25)	3 (5)	132 (19)	152 (15)	18 (2)	0 (0)	13 (5)	0 (0)	3 (4)	124 (38)	485 (28)	36 (21)	111 (13)	2 (3)	1 (2)	0 (0)	8 (11)	5 (1)
4	49 (22)	121 (49)	29 (31)	89 (24)	73 (72)	39 (37)	9 (19)	14 (20)	0 (0)	13 (19)	94 (38)	89 (44)	1 (2)	0 (0)	86 (82)	12 (13)	14 (11)	10 (16)	3 (6)
5	76 (149)	69 (64)	37 (29)	104 (143)	58 (43)	66 (38)	8 (7)	56 (51)	0 (0)	3 (5)	151 (75)	104 (24)	39 (31)	27 (41)	33 (16)	15 (13)	0 (0)	7 (11)	1 (3)
6	54 (8)	30 (17)	11 (11)	280 (178)	143 (49)	36 (17)	24 (19)	15 (3)	0 (0)	0 (0)	65 (31)	623 (65)	4 (4)	15 (4)	31 (27)	16 (33)	8 (0)	0 (0)	12 (11)
7	218 (155)	30 (31)	5 (8)	99 (48)	36 (37)	18 (19)	18 (19)	0 (0)	1 (1)	0 (0)	172 (46)	461 (65)	0 (0)	37 (21)	66 (14)	49 (13)	27 (10)	0 (0)	0 (0)
8	447 (170)	130 (102)	21 (52)	253 (45)	23 (27)	42 (28)	13 (22)	6 (10)	0 (0)	0 (0)	128 (60)	412 (42)	69 (14)	4 (9)	34 (25)	29 (15)	33 (22)	9 (14)	0 (0)
9	267 (204)	334 (53)	1 (2)	287 (57)	187 (35)	163 (28)	60 (26)	9 (2)	8 (2)	8 (2)	13 (7)	332 (55)	4 (4)	263 (61)	37 (14)	13 (11)	0 (0)	0 (0)	0 (0)
Average of class means (unweighted)	159 (139)	112 (95)	28 (40)	190 (82)	95 (63)	58 (49)	31 (44)	24 (28)	3 (7)	8 (14)	100 (59)	418 (311)	18 (24)	57 (85)	43 (26)	20 (17)	12 (13)	5 (5)	3 (4)

Table 4.9 (Continued)

	WORD STRUCTURE							WORD MEANING							
Class	SCC 21	SCC 22	SCC 23	SCC 24	SCC 25	SCC 26	SCC 27	SCC 28	SCC 29	SCC 30	SCC 31	SCC 32	SCC 33	SCC 34	SCC 35
1	131 (91)	136 (84)	13 (8)	135 (59)	150 (108)	66 (48)	0 (0)	14 (19)	14 (20)	71 (4)	9 (1)	0 (0)	39 (5)	18 (5)	23 (9)
2	14 (4)	5 (5)	9 (9)	33 (38)	0 (0)	40 (38)	8 (8)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (5)	0 (0)	0 (0)
3	86 (18)	6 (9)	0 (0)	10 (10)	0 (0)	1 (2)	0 (0)	0 (0)	2 (3)	67 (11)	0 (0)	5 (4)	0 (0)	3 (4)	0 (0)
4	62 (9)	0 (0)	0 (0)	6 (21)	0 (0)	3 (9)	0 (0)	0 (0)	44 (22)	139 (25)	9 (13)	0 (0)	84 (52)	0 (0)	0 (0)
5	36 (32)	9 (14)	3 (6)	182 (175)	11 (17)	34 (26)	2 (5)	3 (4)	10 (13)	26 (22)	0 (0)	0 (0)	0 (0)	0 (0)	35 (34)
6	18 (27)	121 (17)	5 (5)	7 (31)	18 (29)	21 (20)	0 (0)	6 (25)	15 (35)	172 (98)	0 (0)	4 (13)	57 (51)	0 (0)	0 (0)
7	59 (34)	37 (27)	9 (6)	66 (20)	0 (0)	0 (0)	0 (0)	16 (14)	14 (12)	66 (37)	0 (0)	8 (3)	0 (0)	9 (3)	0 (0)
8	12 (18)	0 (0)	0 (0)	35 (38)	0 (0)	14 (52)	0 (0)	0 (0)	0 (0)	97 (20)	10 (16)	0 (0)	7 (11)	16 (9)	0 (0)
9	149 (103)	0 (1)	0 (0)	168 (127)	0 (0)	2 (4)	38 (5)	136 (65)	0 (0)	36 (15)	0 (0)	0 (0)	0 (0)	0 (0)	18 (17)
Average of class means (unweighted)	63 (50)	35 (54)	4 (5)	77 (70)	20 (49)	20 (23)	5 (13)	19 (44)	11 (14)	75 (54)	3 (5)	2 (3)	21 (31)	5 (7)	8 (13)

Table 4.9 (Continued)

	COMPREHENSION														AREAS RELATED TO READING						
Class	SCC 36	SCC 37	SCC 38	SCC 39	SCC 40	SCC 41	SCC 42	SCC 43	SCC 44	SCC 45	SCC 46	SCC 47	SCC 51	SCC 52	SCC 48	SCC 49	SCC 50	SCC 53	SCC 54	SCC 59	SCC 60
1	13 (23)	0 (0)	24 (5)	11 (1)	32 (15)	14 (6)	0 (0)	15 (9)	3 (4)	85 (34)	2 (3)	7 (12)	2 (3)	1 (1)	46 (17)	0 (0)	3 (4)	2 (3)	0 (0)	49 (19)	71 (10)
2	92 (23)	0 (0)	0 (0)	84 (25)	91 (24)	0 (0)	0 (0)	0 (0)	0 (0)	144 (40)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	614 (37)
3	35 (41)	8 (5)	51 (30)	118 (28)	20 (18)	4 (7)	0 (0)	0 (0)	0 (0)	170 (40)	41 (8)	21 (5)	7 (2)	0 (0)	0 (0)	37 (40)	23 (6)	0 (0)	0 (0)	46 (18)	0 (0)
4	60 (33)	69 (51)	0 (0)	131 (117)	36 (14)	51 (61)	0 (0)	0 (0)	0 (0)	51 (40)	121 (54)	78 (50)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	129 (44)
5	69 (57)	39 (33)	48 (35)	16 (14)	25 (30)	0 (0)	0 (0)	0 (0)	0 (0)	154 (37)	15 (14)	0 (0)	0 (0)	0 (0)	30 (28)	0 (0)	0 (0)	0 (0)	0 (0)	36 (13)	21 (18)
6	16 (4)	1 (1)	4 (13)	3 (3)	27 (29)	3 (4)	14 (48)	8 (28)	0 (0)	0 (0)	7 (16)	0 (0)	0 (0)	0 (0)	33 (17)	6 (25)	0 (0)	0 (0)	0 (0)	41 (9)	211 (33)
7	76 (15)	82 (14)	41 (26)	85 (15)	45 (10)	49 (7)	40 (14)	8 (7)	0 (0)	60 (19)	58 (32)	21 (10)	0 (0)	0 (0)	98 (33)	0 (0)	53 (11)	0 (0)	32 (14)	80 (19)	92 (31)
8	25 (18)	9 (14)	20 (32)	32 (8)	0 (0)	4 (6)	4 (6)	23 (5)	12 (8)	133 (37)	35 (7)	22 (7)	34 (11)	9 (21)	530 (67)	13 (0)	0 (0)	0 (0)	0 (0)	24 (8)	3 (4)
9	73 (17)	42 (10)	5 (9)	25 (25)	125 (51)	13 (21)	0 (0)	0 (0)	0 (0)	21 (8)	50 (8)	0 (0)	0 (0)	0 (0)	403 (32)	0 (0)	0 (0)	0 (0)	0 (0)	506 (52)	0 (0)
Average of class means (unweighted)	51 (29)	28 (32)	22 (21)	56 (49)	45 (39)	15 (20)	6 (13)	6 (8)	2 (4)	91 (62)	37 (33)	17 (25)	5 (11)	1 (3)	127 (198)	6 (12)	9 (18)	0 (1)	4 (11)	131 (292)	127 (196)

Table 4.9 (Continued)

Class	READING PRACTICE								MISCELLANEOUS					Total time allocated to reading (SCC 1 through 68)
	SCC 12	SCC 13	SCC 55	SCC 56	SCC 57	SCC 61	SCC 62	SCC 67	SCC 63	SCC 64	SCC 65	SCC 66	SCC 68	
1	73 (16)	16 (8)	26 (7)	302 (40)	107 (12)	31 (6)	49 (9)	0 (0)	15 (27)	6 (11)	85 (13)	0 (0)	5 (3)	3510 (232)
2	5 (9)	212 (20)	0 (0)	242 (55)	171 (39)	333 (63)	94 (34)	0 (0)	353 (41)	155 (16)	15 (4)	0 (0)	0 (0)	4350 (244)
3	212 (74)	236 (39)	21 (2)	317 (31)	414 (67)	0 (0)	72 (8)	0 (0)	283 (42)	67 (5)	62 (14)	0 (0)	2 (3)	3797 (306)
4	182 (152)	224 (176)	0 (0)	91 (110)	450 (153)	0 (0)	0 (0)	0 (0)	68 (24)	0 (0)	0 (0)	0 (0)	0 (0)	2833 (241)
5	11 (7)	34 (35)	16 (3)	156 (98)	161 (24)	121 (28)	46 (29)	48 (9)	136 (97)	42 (26)	0 (0)	0 (0)	0 (0)	2428 (588)
6	140 (80)	32 (31)	19 (3)	54 (25)	236 (25)	51 (6)	39 (20)	157 (12)	359 (20)	350 (35)	94 (16)	0 (0)	18 (8)	3733 (261)
7	319 (46)	244 (41)	0 (0)	191 (89)	245 (56)	0 (0)	66 (16)	73 (14)	106 (17)	199 (60)	0 (0)	0 (0)	0 (0)	3886 (368)
8	162 (84)	124 (24)	29 (7)	130 (5)	241 (25)	127 (16)	121 (28)	0 (0)	334 (31)	40 (7)	0 (0)	0 (0)	0 (0)	4132 (245)
9	17 (5)	61 (64)	0 (0)	92 (7)	151 (8)	40 (12)	177 (37)	0 (0)	361 (25)	903 (81)	0 (0)	0 (0)	0 (0)	5999 (336)
Average of class means (unweighted)	125 (107)	131 (98)	12 (12)	175 (95)	242 (118)	78 (107)	74 (52)	31 (54)	224 (141)	196 (288)	28 (40)	0 (0)	3 (6)	3852 (1009)

Notes

The columns of this table are specific content categories. The names of the categories corresponding to the column numbers of the table are presented in Appendix B.

These data are based on teacher log reports prorated for 40 days of instruction. The row totals correspond to 40 times the average minutes per student per day allocated to reading instruction reported in Table 4.1

Standard deviations are shown in parentheses.

allocate substantial time to specific content category 62 (silent reading).

When interpreting Table 4.9, note that the class averages may not reflect the time allocation for a given student. The within-class standard deviations are of some assistance in assessing the variability among students. In some cases, the standard deviations were considerably greater than the means; this situation arose when most students in the class had almost zero time allocated to a given area while a few students had large allocations. Content categories with relatively small mean times were characterized by these positively skewed distributions. On the other hand, content categories where time was allocated to all students tended to be characterized by negatively skewed distributions. The tail of the distribution often resulted from student absenteeism. Between class variability was, in general, greater than that within classes.

The distribution of time allocated to reading in various setting combinations is presented in Table 4.10. The three dichotomous setting variables (adult involvement, pacing, and group size) yield eight three-way combinations, shown in columns 1 through 8. The marginal distributions for the three setting variables are presented in columns 9 through 14. With two exceptions, over 80 percent of time allocated to reading had direct adult involvement. The exceptions, Classes 2 and 9, had 69 and 44 percent respectively.

The allocations of time by pacing and group size were not consistent across classes. On the average, students spent about 65 percent of the time allocated to reading instruction in seatwork and about 55 percent of the time in large groups. However classes varied remarkably on both of these setting facets. For the pacing facet, Classes 4, 5 and 9 used

Table 4.10

Means and standard deviations for time allocated to setting combinations during reading instruction in nine Grade 2 classes. The entries are class averages reported in minutes per student accumulated over 40 days of instruction.

Class	A S L	A S H	A O L	A O H	N S L	N S H	N O L	N O H	A	N	S	O	L	H	Total Time Allocated to Reading
1	903 (726)	1538 (860)	225 (385)	844 (446)	0 (0)	0 (0)	0 (0)	0 (0)	3510 (232)	0 (0)	2441 (169)	1069 (83)	1128 (1111)	2382 (1303)	3510 (232)
2	386 (260	1796 (109)	611 (199)	218 (31)	188 (123)	534 (60)	619 (103)	0 (0)	3010 (163)	1340 (93)	2904 (369)	1447 (275)	1803 (164)	2547 (164)	4350 (244)
3	893 (111)	417 (58)	1108 (121)	907 (77)	297 (44)	6 (10)	155 (28)	13 (11)	3326 (250)	471 (68)	1614 (183)	2183 (187)	2453 (197)	1344 (118)	3797 (306)
4	2402 (265)	0 (0)	3 (10)	34 (5)	394 (115)	0 (0)	0 (0)	0 (0)	2439 (270)	394 (115)	2796 (236)	37 (11)	2799 (239)	34 (5)	2833 (241)
5	1041 (144)	706 (299)	7 (16)	210 (62)	68 (60)	363 (259)	7 (17)	25 (29)	1965 (423)	463 (305)	2178 (560)	250 (69)	1124 (184)	1304 (436)	2428 (588)
6	561 (258)	1120 (359)	358 (120)	1061 (74)	419 (203)	171 (133)	0 (0)	42 (12)	3101 (218)	632 (73)	2271 (169)	1461 (125)	1338 (576)	2394 (548)	3733 (261)
7	610 (90)	351 (76)	1624 (170)	925 (92)	57 (44)	177 (38)	45 (27)	98 (26)	3510 (355)	377 (60)	1195 (147)	2692 (241)	2336 (243)	1550 (143)	3886 (368)
8	116 (154)	785 (55)	533 (190)	1829 (111)	391 (128)	350 (44)	9 (23)	119 (30)	3263 (295)	869 (128)	1641 (102)	2491 (186)	1049 (246)	3083 (186)	4132 (245)
9	304 (354)	1464 (254)	260 (178)	602 (328)	790 (834)	2446 (701)	84 (54)	49 (34)	2630 (135)	3369 (254)	5004 (395)	996 (157)	1438 (1415)	4562 (1304)	5999 (336)
Average of class means (unweighted)	802 (673)	909 (609)	525 (534)	737 (551)	289 (246)	450 (772)	102 (201)	38 (44)	2973 (527)	879 (1005)	2449 (1111)	1403 (931)	1719 (659)	2133 (1283)	3852 (1009)

Notes

The column headings represent combinations of the three setting variables;

adult involvement (A = adult directly involved, N = adult not directly involved),
pacing (S = seatwork, O = non seatwork), and group size (L = small group size, H = large group size).

These data are based on teacher log reports prorated for 40 days of instruction. The row totals correspond to 40 times the average minutes per student per day allocated to reading instruction reported in Table 4.1.

Standard deviations are shown in parentheses.

seatwork more than 80 percent of the time; while Classes 1, 2, and 6 and Classes 3, 7 and 8 used seatwork approximately 65 and 40 percent of the time respectively. For the group size facet, Class 4 used small groups exclusively; Classes 1, 2, 3, 5, 6 and 7 used small groups about half of the time and Classes 8 and 9 used small groups for approximately one quarter of the time allocated to reading.

When the combined settings were examined, no single allocation pattern characterized all of the classes. Although the distribution of allocated time to setting combinations differed from class to class, the NOL and NOH setting combinations were used least by almost all classes. Class 4 allocated substantial amounts of time to only two setting combinations (ASL and NSL); Class 1 used only the four setting combinations including adult directly involved; the remaining classes allocated substantial amounts of time to five or more setting combinations. The single setting combination with the most allocated time was large group seatwork with an adult directly involved. On the average ASH accounted for 25 percent of the time allocated to reading; however, this setting combination ranked highest in only three of the nine classes. The setting combinations which, on the average, ranked second and third in terms of amount of allocated time were ASL (21 percent) and AOH (19 percent). Again the variation between classes on time allocated to setting combinations was much greater than the variation within classes.

Allocated time data did not necessarily reflect the amount of time students spent engaged in on-task behavior. Table 4.11 presents some information on student engagement during reading instruction. Columns A, B, and C, of this table show the means and standard deviations for

Table 4.11

Means, standard deviations and intercorrelations for estimates of student engagement in six Grade 2 classes.

Class	Number of Students	A Teacher ratings of Student Attentiveness[a]	B Adjusted Teacher Ratings of Student Attentiveness[b]	C Observed Engagement Rate[c]	D Academic Status	r_{BC}	r_{BD}	r_{CD}
1	16	.68 (.22)[d]	.44 (.14)	.38 (.05)	160 (91)	.35	.70	.47
2	18	.86 (.08)	.49 (.04)	.85 (.14)	139 (77)	.35	.57	.41
3	20	.58 (.16)	.25 (.07)	.34 (.03)	36 (35)	.79	.42	.28
4	14	.69 (.14)	.59 (.12)	.75 (.10)	147 (95)	-.08	.42	.33
5	26	.68 (.18)	.41 (.11)	.52 (.07)	133 (66)	-.30	.80	-.29
6	18	.62 (.22)	.51 (.18)	.44 (.09)	77 (54)	.39	.58	.42
All students pooled	112	.68 (.19)	.44 (.15)	.54 (.20)	114 (81)	.42	.58	.35

[a] The teacher ratings of student attentiveness are described on page 37.

[b] The adjusted teacher ratings of student attentiveness were obtained by multiplying the teacher ratings of student attentiveness by a different constant for each class. The mean of the adjusted ratings equals the mean class engagement determined by one day of observation in each class (see page 37).

[c] The observed engagement rate was calculated by taking the ratio for each student of engaged time in reading (direct observation) and allocated time in reading (observer logs) (see page 38).

[d] Standard deviations are shown in parentheses.

different engagement indices. The average teacher ratings of student attentiveness (column A) were, with one exception, higher than either of the averages of the indices based on independent observation procedures (columns B and C). The standard deviation (within class) of the teacher ratings (column A) was also greater, with only one exception, than those for columns B and C. With the exception of Classes 2 and 4, there was moderate agreement between columns B and C. The correlation between the adjusted teacher ratings of student attentiveness and the observed engagement rates varied considerably for the six classes. Since the number of students within classes was small, only one of these correlations (Class 3) appeared to be inordinately large. Thus with the exception of Class 3, the adjusted teacher ratings did not correlate consistently and positively with the observed engagement rates. When all students were pooled, the correlation was positive and moderate in size. Since this correlation coefficient is affected by the fairly large between-class differences, its size is not surprising.

On the other hand, the correlations between the adjusted teacher ratings of student attentiveness and academic status were all positive and large. This could be interpreted in several ways. It may be that aptitude and student attentiveness were strongly related; or more likely, that the teachers' ratings of student attentiveness were strongly biased by teacher perceptions of student aptitude. In any case, the within-class correlations in the table were not affected by the adjustment procedure, since the adjustment coefficient was a constant within a given class. The observed engagement rates, on the other hand, were derived without reference to students' academic status. If the observed

engagement rates are reasonably accurate, this table points out that teacher ratings of student attentiveness were strongly related to academic status, and not to observed engagement rates. In addition, observed engagement rates were only weakly correlated with academic status.

Students were engaged in on-task behavior about one half of the time allocated to reading. This figure varied considerably from class to class.

Instructional Time and Student Achievement

The conceptual and methodological issues concerning the relationship between instructional time and student achievement are very complex. A relatively large number of models and analytic procedures could be used to investigate the relationship. Several exploratory analyses have been carried out on this data set. Within-class regression analyses were performed, but the small number of students per class made the results unstable, and therefore difficult to interpret. Raw regression weights varied remarkably from class to class and also within class when one or more students were removed. In addition, several interaction terms and alternative definitions of time variables were included in the model, with varying degrees of success. Not all of these analyses are included in this report. Those which are included represent only one relatively narrow approach to the problem.

In every case, achievement scores have been corrected for guessing; however, no other transformations affecting the score intervals have been made. In some cases, severe ceiling effects have been reduced by trimming subjects rather than by transforming the data in some non-linear

fashion. (Other instances of trimming subjects are discussed as they occur.) The time variables are reported in minutes. For allocated time from teacher logs and engaged time from direct observation, the raw data were recorded in minutes. In the case of engaged time estimated from teacher logs, the allocated times from teacher logs were multiplied by an observed engagement rate.

In general, results of multiple regression analyses are presented for achievement (post) regressed on achievement (pre), academic status, and two time variables. One of the time variables represents time in the content category which matches the content covered by the achievement test; the second time variable represents time in a content area which is logically related to the content area covered by the achievement test. Results of an analysis pooling subjects are followed by results of an analysis where subjects were pooled within class. For analyses of data collected over the A-B period, regression runs were made using allocated times, and rerun using engaged times estimated from allocated times. In all analyses, estimated engaged times were calculated by taking the product of allocated times from teacher logs and observed engagement rates.

Results for data collected during the OA-OB period are presented first, followed by results for data collected during the A-B period.

Results from the OA-OB period. Classes 1 through 6 comprised the observation subsample. All results in this section are based on data from these six classes. The OA-OB period was approximately two weeks in length for each class. Pre and post achievement tests were administered and engaged time was assessed by direct observation for all of the intervening in-school instruction. Means and standard deviations for

the achievement measures and engaged time in matched content categories are presented in Table 4.12. During the OA-OB period, teachers were asked to allocate time to instruction in compound words. Some teachers responded by allocating small amounts of time to compound words, while others allocated practically none. As a result, there were small amounts of engaged time and also little variance in the amount of engaged time in compound words. Note from Table 4.12 that, given the short two-week time period, there was a small gain in achievement in compound words. Five of the classes had gains of less than one point and the sixth class showed a small loss over the two-week period.

The other two content areas covered in Table 4.12 showed slight losses. For both decoding-long vowels and decoding (total) only two of the six classes showed non-negative gains. Decoding-long vowels is a relatively narrow content area in which moderate to small amounts of engaged time were recorded. Decoding, on the other hand, is a broad content area (including decoding-long vowels and eleven other specific content categories) in which relatively large amounts of engaged time were observed.

Compare the variation within class at OB with that at OA for each of the measures. In 9 of the 18 situations in Table 4.12 the variation was less at OB than at OA. The major cause of this phenomenon was a severe ceiling effect in all three measures. The combined impact of the ceiling effect on all OA-OB measures and the small amount of engaged time in two of the matched content categories made time-achievement analyses for the OA-OB period extremely hazardous. No further analyses of decoding-long vowels or decoding (total) were attempted.

Table 4.12

Means and standard deviations for achievement measures and engaged time in matched content categories over the OA-OB period for six Grade 2 classes.

Class	Max N	Min N	Academic Status	Decoding - Long Vowels			Decoding			Compound Words		
				Pre Test (22 items)	Post Test (22 items)	Engaged Time (minutes)	Pre Test (14 items)	Post Test (14 items)	Engaged Time (minutes)	Pre Test (10 items)	Post Test (10 items)	Engaged Time (minutes)
1	16	16	160.5 (91.1)	14.1 (7.6)	15.0 (6.3)	27 (25)	9.5 (4.4)	9.5 (3.5)	203 (48)	6.7 (3.2)	7.3 (3.4)	22 (39)
2	18	17	138.9 (77.0)	12.7 (8.3)	12.5 (7.6)	4 (5)	8.9 (4.4)	9.6 (4.2)	108 (35)	7.4 (3.1)	7.2 (3.1)	3 (5)
3	20	19	36.4 (35.0)	5.7 (5.0)	2.8 (5.4)	39 (4)	5.2 (3.7)	3.8 (3.7)	112 (20)	2.1 (4.2)	3.0 (4.0)	14 (5)
4	14	13	147.3 (94.7)	14.0 (8.0)	14.1 (6.7)	8 (12)	10.2 (3.3)	9.9 (3.8)	224 (54)	6.9 (3.9)	7.5 (3.4)	16 (3)
5	26	24	133.0 (65.5)	14.9 (6.7)	14.0 (6.9)	3 (5)	9.5 (3.5)	8.5 (4.6)	55 (36)	7.0 (2.7)	7.3 (2.4)	4 (11)
6	18	17	76.5 (53.7)	10.4 (7.2)	10.0 (7.5)	18 (22)	7.2 (3.1)	6.1 (3.9)	79 (26)	7.2 (3.5)	7.6 (2.5)	1 (3)
Average over students	112	106	113.5 (81.4)	12.0 (7.7)	11.3 (7.9)	16 (19)	8.3 (4.1)	7.8 (4.5)	120 (70)	6.2 (3.9)	6.6 (3.5)	9 (17)
Average of class means (unweighted)	6	6	115.4 (48.3)	12.0 (3.5)	11.4 (4.6)	17 (14)	8.4 (1.9)	7.9 (2.4)	130 (68)	6.2 (2.0)	6.7 (1.8)	10 (9)

Notes

Engaged time was assessed by direct observation.

Standard deviations are shown in parentheses.

An analysis of engaged time and achievement in compound words was carried out. The distribution of pretest scores was examined and subjects were trimmed from the extreme top and bottom of the distribution. Subjects were trimmed from the top because of the ceiling effect. All students who scored 7.5 or higher (61 students) on the pretest were deleted since they could not possibly show a substantial gain on this particular measure. Students who scored -3 or less (3 students) were also trimmed since they would be likely to obtain artificially high gains even without intervening instruction. After trimming and deleting one student with missing data, 47 students remained in the file.

Regression analyses were conducted on this severely reduced sample. Achievement in compound words (post) was regressed on achievement in compound words (pre), academic status, engaged time in compound words (general content category 4), and engaged time in other word structure (general content category 5) assessed by direct observation over the OA-OB period. The means, standard devistions and intercorrelations for the variables are presented in Table 4.13. For this group of students, a moderate gain in achievement was observed, however very small amounts of engaged time were recorded during the intertest interval. From the intercorrelations it was clear that variation in the posttest was strongly related to variation in the pretest. Regression analyses with subjects pooled (and with subjects pooled within class) confirmed this observation. Practically no variation in the posttest was related to either academic status or engaged time after the pretest had been accounted for. The regression weights for engaged time in the matched content category were all positive but none of the coefficients neared

Table 4.13

Means, standard deviations and intercorrelations for achievement in compound words and associated measures of engaged time[a] assessed over the OA-OB interval.

Variable	Mean	Standard Deviation	Correlations[c] 1	2	3	4	5
1 Compound Words (Post)	4.5	3.4 (3.1)[b]		0.63	0.44	0.05	0.24
2 Compound Words (Pre)	3.6	2.7 (2.5)	0.57		0.50	0.01	0.35
3 Academic Status	65.4	47.8 (37.0)	0.33	0.43		0.15	0.69
4 Engaged Time in Compound Words	14	24 (19)	0.12	0.00	0.07		0.22
5 Engaged Time in Other Word Structure	8	13 (9)	0.07	0.23	0.54	0.03	

Note
N = 47
(Students from Classes 1 through 6 were included.)

[a] Engaged time was assessed by direct observation.

[b] Standard deviations, calculated when students were pooled within class, are shown in parentheses.

[c] Correlations, computed when students were pooled within class, are shown below the major diagonal.

significance. Neither time nor academic status accounted for more than 2 percent of the posttest variance in any of the analyses. Since the ceiling effect was severe and the amounts of engaged time were very small, these data did not yield very powerful analyses. However, it is interesting to note that the partial correlation between engaged time in compound words and post achievement in compound words was always substantially higher in analyses where subjects were pooled within class (as opposed to analyses where subjects were pooled). In those analyses where academic status and engaged time in compound words were entered, when subjects were pooled within class, the time variable was as highly correlated with the posttest as with academic status (when other variables were partialled out).

No other analyses relating time and achievement were conducted on the data collected during the OA-OB period.

Results from the A-B period. The A-B period was approximately eight weeks in length for each class. Pre and post achievement tests were administered, and allocated time was reported in teacher logs for all of the intervening in-school reading instruction. Means and standard deviations for the achievement measures and allocated time in matched content categories are presented in Table 4.14.

All measures showed an overall gain over the A-B period. There were a few exceptions when the pre and post means were compared for each class. Of the 108 cases (12 measures x 9 classes) there were nine occasions when class means decreased from A to B. As in the OA-OB test data, the posttest variance (within class) was less than the pretest variance for a substantial number of situations (44 out of 108).

Table 4.14

Means and standard deviations for achievement measures and allocated time in matched content categories over the A-B period for nine Grade 2 classes.

Class	Max N	Min N	Academic Status	Decoding - Consonant Sounds (speeded test)[1]			Decoding - Long Vowels			Decoding - Consonant Substitutions		
				Pre Test (24 items)	Post Test (24 items)	Allocated Time (minutes)	Pre Test (22 items)	Post Test (22 items)	Allocated Time (minutes)	Pre Test (10 items)	Post Test (10 items)	Allocated Time (minutes)
1	19	11	150.5 (21.1)	17.5 (6.7)	18.3 (6.0)	181 (95)	15.8 (6.2)	18.1 (3.2)	497 (89)	4.7 (3.5)	6.7 (2.7)	143 (79)
2	23	15	138.9 (77.0)	15.6 (6.0)	18.6 (5.1)	160 (26)	12.8 (8.0)	14.2 (8.2)	267 (69)	3.2 (4.1)	6.1 (3.1)	11 (11)
3	20	16	36.4 (28.0)	4.2 (4.0)	8.9 (7.5)	240 (45)	6.3 (5.2)	5.1 (4.7)	279 (28)	-0.6 (1.3)	0.8 (2.1)	115 (35)
4	14	11	147.3 (94.7)	9.5 (6.4)	19.1 (4.7)	144 (40)	13.1 (6.7)	15.0 (6.7)	170 (98)	3.3 (4.3)	4.6 (4.2)	19 (32)
5	29	23	133.0 (85.6)	11.7 (4.5)	16.9 (5.1)	134 (139)	13.7 (6.3)	17.6 (5.3)	212 (177)	4.0 (2.9)	5.4 (3.5)	140 (70)
6	18	16	76.5 (58.7)	7.6 (5.4)	13.3 (5.3)	83 (20)	9.5 (7.1)	13.5 (4.5)	137 (176)	1.3 (3.0)	1.2 (2.5)	32 (30)
7	14	11	124.8 (61.8)	13.7 (8.0)	17.8 (5.5)	193 (103)	11.3 (7.1)	15.7 (5.9)	122 (81)	3.3 (3.9)	4.8 (3.7)	135 (36)
8	21	12	26.1 (30.3)	4.3 (6.2)	5.9 (5.2)	401 (147)	2.8 (5.4)	5.0 (5.8)	254 (65)	0.5 (1.5)	0.8 (2.7)	118 (46)
9	13	11	122.6 (32.4)	11.6 (8.6)	16.0 (5.3)	420 (177)	11.3 (8.3)	14.5 (7.2)	445 (48)	1.9 (3.7)	5.7 (3.1)	95 (59)
[illegible]	192	132	731.2 (51.2)	11.7 (7.2)	18.4 (7.5)	209 (134)	11.0 (7.9)	13.4 (7.3)	295 (262)	2.5 (3.6)	4.0 (3.8)	92 (97)
[illegible]	9	9	133.8 (8.7)	10.7 (4.8)	14.3 (4.0)	203 (132)	10.7 (4.8)	13.2 (4.9)	258 (132)	2.4 (2.7)	3.9 (2.5)	97 (59)

Table 4.14 (Continued)

Class	Max N	Min N	Academic Status	Decoding (total)[2]			Context Clues - Form of Word			Context Clues (total)		
				Pre Test (86 items)	Post Test (86 items)	Allocated Time (minutes)	Pre Test (10 items)	Post Test (10 items)	Allocated Time (minutes)	Pre Test (30 items)	Post Test (30 items)	Allocated Time (minutes)
1	16	11	160.5 (91.1)	53.8 (23.1)	61.5 (18.0)	1401 (173)	3.2 (3.8)	4.0 (4.6)	42 (7)	12.8 (9.8)	18.7 (10.7)	200 (41)
2	18	16	138.9 (77.0)	51.1 (24.8)	58.2 (23.0)	1491 (154)	2.6 (3.3)	3.7 (4.8)	0 (0)	11.1 (8.6)	16.6 (11.2)	24 (26)
3	20	16	36.4 (35.0)	18.1 (15.8)	20.8 (13.2)	1134 (75)	0.7 (1.9)	0.1 (2.4)	1 (1)	2.4 (2.6)	4.1 (5.1)	117 (11)
4	14	11	147.3 (94.7)	48.9 (23.7)	60.0 (21.7)	524 (179)	3.2 (4.9)	3.1 (4.6)	10 (11)	13.9 (12.4)	16.7 (10.1)	107 (88)
5	26	23	133.0 (65.5	49.1 (16.3)	60.0 (18.1)	715 (391)	1.3 (3.0)	2.7 (4.0)	14 (12)	10.6 (9.5)	15.1 (9.6)	76 (46)
6	18	16	76.5 (53.7)	31.3 (17.2)	45.6 (15.2)	1223 (151)	0.6 (2.9)	1.3 (2.7)	15 (31)	3.5 (6.5)	9.1 (7.3)	78 (35)
7	14	11	124.8 (61.8)	44.8 (21.0)	53.6 (18.4)	846 (75)	1.5 (2.8)	2.5 (3.3)	40 (10)	7.3 (5.3)	12.3 (9.4)	143 (42)
8	13	12	26.1 (30.3)	15.3 (12.9)	20.5 (16.0)	1234 (171)	0.2 (1.7)	0.1 (2.5)	23 (12)	0.5 (3.7)	1.0 (4.8)	88 (48)
9	13	11	117.8 (92.6)	40.0 (25.9)	53.0 (24.6)	1170 (237)	3.0 (2.9)	2.3 (4.3)	9 (7)	11.8 (8.4)	13.8 (11.5)	220 (46)
Average Over Students	152	131	107.2 (81.2)	39.7 (23.8)	48.4 (23.8)	1072 (371)	1.8 (3.2)	2.2 (3.9)	16 (19)	8.4 (9.1)	12.1 (10.5)	111 (72)
Average of Class Means (Unweighted)	9	9	106.8 (48.6)	39.1 (14.4)	48.1 (16.3)	1082 (321)	1.8 (1.2)	2.2 (1.4)	17 (15)	8.2 (5.0)	11.9 (6.1)	117 (62)

Table 4.14 (Continued)

Class	Max N	Min N	Academic Status	Word Structure - Compound Words: Pre Test (10 items)	Post Test (10 items)	Allocated Time (minutes)	Word Structure (total): Pre Test (65 items)	Post Test (65 items)	Allocated Time (minutes)	Word Meaning - Synonyms: Pre Test (18 items)	Post Test (18 items)	Allocated Time (minutes)
1	16	11	160.5 (91.1)	6.3 (4.7)	8.2 (3.6)	131 (91)	25.1 (22.1)	33.5 (19.8)	629 (210)	6.6 (3.8)	8.2 (4.0)	14 (19)
2	18	16	138.9 (77.0)	4.9 (5.4)	7.4 (3.3)	13 (4)	19.2 (20.3)	29.8 (20.8)	101 (89)	5.9 (5.6)	9.2 (7.1)	0 (0)
3	20	16	36.4 (35.0)	-0.3 (1.3)	3.1 (4.7)	80 (16)	2.4 (7.4)	4.7 (11.8)	96 (24)	1.0 (3.6)	1.6 (3.9)	0 (0)
4	14	11	147.3 (64.7)	5.5 (4.5)	8.3 (2.1)	52 (8)	18.5 (17.0)	33.7 (14.2)	60 (19)	4.2 (6.4)	7.4 (7.4)	0 (0)
5	26	23	168.0 (65.8)	6.0 (3.5)	9.1 (2.9)	34 (30)	17.4 (14.0)	33.7 (14.0)	266 (169)	4.7 (5.3)	8.2 (5.5)	2 (4)
6	18	16	76.5 (53.7)	3.9 (4.6)	7.8 (3.3)	27 (26)	10.9 (8.6)	26.1 (11.8)	191 (53)	1.2 (2.6)	2.3 (4.4)	6 (23)
7	14	11	124.9 (71.3)	6.5 (3.7)	7.5 (5.3)	47 (27)	23.1 (14.9)	29.8 (18.0)	137 (69)	3.0 (3.4)	5.0 (5.0)	15 (11)
8	18	16	86.1 (52.3)	0.7 (3.8)	1.8 (5.4)	7 (14)	-2.0 (22.3)	2.8 (16.0)	86 (62)	0.5 (2.1)	1.5 (3.2)	3 (8)
9	13	11	117.8 (92.1)	3.8 (4.7)	6.1 (4.7)	104 (72)	18.5 (23.9)	27.2 (19.8)	240 (151)	3.6 (5.0)	4.7 (5.2)	55 (49)
10 Points	452	332	1207.4 (61.2)	4.1 (4.7)	6.5 (4.5)	52 (56)	14.8 (17.7)	24.6 (19.5)	203 (198)	3.5 (5.1)	5.4 (6.1)	12 (31)
Mean Scores for Matched Pairs	9	9	106.8 (46.8)	4.1 (2.4)	6.8 (2.5)	54 (43)	14.8 (9.2)	24.6 (12.1)	200 (176)	3.4 (2.2)	5.3 (3.1)	14 (32)

Table 4.14 (Continued)

Class	Max N	Min N	Academic Status	Comprehension - Description			Comprehension (total)			Reading (total)[2]		
				Pre Test (13 items)	Post Test (13 items)	Allocated Time (minutes)	Pre Test (50 items)	Post Test (50 items)	Allocated Time (minutes)	Pre Test (301 items)	Post Test (301 items)	Allocated Time (minutes)
1	16	11	100.5 (91.1)	3.0 (4.0)	5.0 (3.4)	0 (0)	12.1 (14.2)	20.0 (15.0)	207 (49)	130.3 (85.9)	164.1 (72.9)	3398 (255)
2	18	16	138.9 (77.0)	2.9 (3.2)	5.9 (3.7)	0 (0)	13.0 (9.4)	22.6 (13.2)	381 (104)	119.3 (70.9)	161.3 (83.4)	3544 (213)
3	20	16	36.4 (35.0)	-0.1 (1.5)	0.8 (2.9)a	7 (4)	0.5 (1.5)	2.6 (7.5)	439 (138)	30.0 (32.6)	37.6 (34.4)	3132 (238)
4	24	21	147.3 (94.7)	4.3 (5.1)	7.1 (4.8)	59 (43)	20.0 (16.8)	27.0 (14.9)	506 (149)	128.4 (86.1)	170.5 (79.7)	2344 (193)
5	26	23	133.0 (89.5)	2.7 (4.2)	5.0 (4.2)	36 (30)	11.4 (13.7)	18.7 (13.8)	339 (174)	107.6 (62.1)	157.2 (65.7)	2084 (482)
6	16	16	76.5 (53.7)	1.2 (2.8)	1.9 (3.3)	1 (1)	6.3 (7.3)	11.4 (10.3)	79 (75)	58.5 (43.3)	106.7 (48.5)	2774 (207)
7	14	11	124.8 (81.8)	1.3 (2.3)	4.8 (3.5)	66 (11)	6.2 (6.3)	15.6 (11.2)	454 (70)	102.5 (54.0)	133.7 (69.3)	2866 (263)
8	13	12	26.1 (30.3)	0.8 (2.0)	0.3 (3.1)	7 (11)	0.8 (0.7)	1.2 (5.6)	289 (31)	16.4 (24.6)	30.8 (42.9)	3107 (180)
9	13	12	127.8 (92.4)	2.3 (4.4)	4.4 (4.1)	39 (7)	13.0 (15.2)	15.7 (14.1)	248 (37)	98.1 (87.4)	127.5 (83.0)	3318 (173)
Average per class	159	132	107.2 (61.2)	2.1 (3.6)	3.9 (4.2)	22 (30)	9.1 (13.2)	14.9 (14.2)	326 (168)	88.3 (73.2)	121.6 (91.6)	2895 (568)
Average of Public Schools (Weighted)	9	9	105.8 (48.8)	2.1 (1.5)	3.9 (2.4)	23 (26)	9.3 (6.3)	15.0 (8.6)	327 (136)	87.6 (42.5)	121.1 (53.3)	2940 (494)

Notes

Allocated time was assessed by teacher logs.

Standard deviations are shown in parentheses.

[1] This is the only speeded test included in the report; all others had liberal time limits.

[2] This total score does not contain the speeded subtest.

Examination of the frequency distributions revealed serious ceiling effects for most of the measures.

The quantities of allocated time varied widely from one content category to another. However the content categories represented in Table 4.14 also varied in size and in several cases overlap in coverage. For example, decoding (total) included decoding-long vowels and decoding consonant substitution as well as other areas of decoding. For a particular content category there was considerable variation both within and between classes. In most cases the variation between classes was greater than that within classes.

Regression analyses were carried out on several of the content areas represented in Table 4.14. In general, areas where ceiling effects were least serious were chosen for analysis. In each case, a frequency distribution of the pretest was examined and cases were trimmed, and students with missing data were deleted before analysis. After reducing the number of subjects (in some cases the reduction was substantial), an analysis where subjects were pooled and an analysis where subjects were pooled within class were carried out on the remaining students from the nine classes in the sample. In these analyses achievement (post) was regressed on achievement (pre), academic status, allocated time in the matched content area and allocated time in a logically related content area.

Two parallel analyses were conducted using estimated engaged time rather than allocated time. Engaged time was estimated by multiplying allocated time by the engagement rate which was obtained during the direct observation. Since only six of the nine classes were observed, engagement rates were available for some students but not for others.

Therefore the sample size for the analyses using estimated engaged time was invariably smaller (representing the omission of three classes) than for the analyses using allocated time.

Tables 4.15 and 4.16 present results for regression analyses of achievement in compound words on allocated time variables. As outlined above, two time variables were entered in the regression equation: the time allocated to compound words (matched category) and the time allocated to other word structure (a logically related content area). After trimming for missing data and for ceiling effects, 79 of the 152 students remained in the file.

The four independent variables accounted for 30 percent of the variance when subjects were pooled and 20 percent when subjects were pooled within class. In both cases, academic status accounted for, by far the greatest portion, of the explained variance. The pretest and both time variables were relatively weak contributors to the posttest variation. However, note that when subjects were pooled within class (Table 4.16), allocated time in compound words had a large raw coefficient, had a substantial partial correlation with the posttest, and was a much stronger contributor than the posttest.

Tables 4.17 and 4.18 present results for similar analyses except that estimated engaged time was used rather than allocated time. These analyses were similar to those reported for allocated time. The four independent variables accounted for 28 percent (subjects pooled) and 25 percent (subjects pooled within class) of the variance in the posttest. Academic status was the strongest contributor in both analyses while the pretest was relatively weak in both. When subjects were pooled, estimated

Table 4.15

Achievement in compound words (post) regressed on achievement in compound words (pre), academic status and measures of allocated time (from teacher logs) over the A-B interval (subjects pooled, N = 79).

I DESCRIPTIVE INFORMATION

	Variable	Mean	Standard Deviation	Correlations 1	2	3	4	5
1	Compound Words (Post)	5.0	4.5					
2	Compound Words (Pre)	1.7	2.7	0.30				
3	Academic Status	62.4	46.5	0.53	0.46			
4	Allocated Time Compound Words	48	57	0.23	0.08	0.23		
5	Allocated Time Other Word Structure	155	158	0.32	0.19	0.35	0.71	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.55	(p = 0.00)[a]
Multiple R Squared	0.30	
Std. Error of Est.	3.86	
Constant	1.45	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[a]	Partial Corr. With Dep.
Compound Words (Pre)	0.0663	0.1112	0.1835	0.37	0.55	0.07
Academic Status	0.4485	0.0435	0.0111	15.38	0.00	0.41
Allocated Time Compound Words	0.0389	0.0031	0.0110	0.08	0.77	0.03
Allocated Time Other Word Structure	0.1187	0.0034	0.0041	0.69	0.59	0.10

Note
To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 79 students (out of 152) representing nine classes were analyzed.

[a] Probabilities rounded to two decimal places.

Table 4.16

Achievement in compound words (post) regressed on achievement in compound words (pre), academic status and measures of allocated time (from teacher logs) over the A-B interval (subjects pooled within class, N = 79).

I DESCRIPTIVE INFORMATION

	Variable	Mean[a]	Standard Deviation	Correlations 1	2	3	4	5
1	Compound Words (Post)	0.0	4.1					
2	Compound Words (Pre)	0.0	2.5	0.24				
3	Academic Status	0.0	39.7	0.47	0.40			
4	Allocated Time Compound Words	0	38	0.36	0.35	0.37		
5	Allocated Time Other Word Structure	0	101	0.33	0.26	0.48	0.72	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.51	(p = 0.00)[b]
Multiple R Squared	0.26	
Std. Error of Est.	3.64	
Constant	0.00	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[b]	Partial Corr. With Dep.
Compound Words (Pre)	0.0068	0.0113	0.1868	0.00	0.95	0.01
Academic Status	0.3943	0.0409	0.0124	10.79	0.00	0.36
Allocated Time Compound Words	0.2262	0.0246	0.0150	2.35	0.13	0.18
Allocated Time Other Word Structure	-0.0217	-0.0009	0.0062	0.02	0.88	-0.02

Note
To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 79 students (out of 152) representing nine classes were analyzed.

[a] The means of within-class deviation scores are zero.

[b] Probabilities rounded to two decimal places.

Table 4.17

Achievement in compound words (post) regressed on achievement in compound words (pre), academic status and measures of estimated engaged time (from teacher logs) over the A-B interval (subjects pooled, N = 56).

I DESCRIPTIVE INFORMATION

	Variable	Mean	Standard Deviation	Correlations 1	2	3	4	5
1	Compound Words (Post)	5.7	3.9					
2	Compound Words (Pre)	1.7	2.8	0.28				
3	Academic Status	67.9	46.5	0.50	0.47			
4	Est. Eng. Time Compound Words	23	22	0.14	0.10	0.17		
				0.38	0.26	0.43	0.53	
5	Est. Eng. Time Other Word Structure	76	79					

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.53	(p = 0.00)[a]
Multiple R Squared	0.28	
Std. Error of Est.	3.46	
Constant	2.76	

Independent Variable	Beta, Stand. Coefficient	B, Raw Coefficient	Stand. Error Of B	F To Delete	Probability[a]	Partial Corr. With Dep.
Compound Words (Pre)	0.0460	0.0634	0.1856	0.12	0.73	0.05
Academic Status	0.3849	0.0325	0.0122	7.09	0.01	0.35
Est. Eng. Time Compound Words	-0.0514	-0.0091	0.0249	0.13	0.72	-0.05
Est. Eng. Time Other Word Structure	0.2256	0.0113	0.0077	2.16	0.14	0.20

Note

To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 56 students (out of 112) representing six classes were analyzed.

[a] Probabilities rounded to two decimal places.

Table 4.18

Achievement in compound words (post) regressed on achievement in compound words (pre), academic status and measures of estimated engaged time (from teacher logs) over the A-B interval (subjects pooled within class, N = 56).

I DESCRIPTIVE INFORMATION

	Variable	Mean[a]	Standard Deviation	Correlations 1	2	3	4	5
1	Compound Words (Post)	0.0	3.6					
2	Compound Words (Pre)	0.0	2.6	0.17				
3	Academic Status	0.0	40.7	0.46	0.38			
4	Est. Eng. Time Compound Words	0	15	0.29	0.35	0.24		
5	Est. Eng. Time Other Word Structure	0	57	0.34	0.22	0.45	0.52	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.50	(p = 0.00)[b]
Multiple R Squared	0.25	
Std. Error of Est.	3.26	
Constant	0.00	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[b]	Partial Corr. With Dep.
Compound Words (Pre)	-0.0652	-0.0917	0.1926	0.23	0.64	-0.07
Academic Status	0.4088	0.0365	0.0129	8.06	0.01	0.37
Est. Eng. Time Compound Words	0.1718	0.0418	0.0359	1.35	0.25	0.16
Est. Eng. Time Other Word Structure	0.0790	0.0050	0.0098	0.26	0.62	0.07

Note
To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 56 students (out of 112) representing six classes were analyzed.

[a] The means of within-class deviation scores are zero.

[b] Probabilities rounded to two decimal places.

engaged time in compound words had a large coefficient, a relatively large partial correlation with the posttest, and was a stronger contribution than the pretest. This result indicates that when class mean differences were removed, students who spent more time engaged in compound words achieved more in compound words than students who spent less time engaged in compound words.

The results of the analyses on achievement in compound words were dominated by the academic status variables. For the time variables, the results were stronger in analyses where subjects were pooled within class than for analyses where subjects were pooled. In the latter type of analysis estimated engaged time uniquely accounted for four percent of the variance in the posttest.

Similar analyses were carried out on time and achievement in decoding-long vowels. Before analysis, subjects were trimmed from the file to eliminate cases with missing data and to reduce ceiling effects. All students with scores outside the range -5 to 17 on the pretest were dropped from the file. After trimming, 91 of the 152 students remained in the file.

Tables 4.19 and 4.20 present analyses where achievement in decoding-long vowels (post) was regressed on achievement in decoding-long vowels (pre), academic status, allocated time in decoding-long vowels and allocated time in other decoding. The pattern of correlations among the variables was similar when the matrix for subjects pooled (Table 4.19) is compared to the matrix for subjects pooled within class (Table 4.20). The pretest, posttest and academic status variables were highly intercorrelated in both tables. Allocated time in long vowels was weakly but

Table 4.19

Achievement in long vowels (post) regressed on achievement in long vowels (pre), academic status and measures of allocated time (from teacher logs) over the A-B interval (subjects pooled, N = 91).

I DESCRIPTIVE INFORMATION

	Variable	Mean	Standard Deviation	Correlations 1	2	3	4	5
1	Long Vowels (Post)	10.7	6.7					
2	Long Vowels (Pre)	7.1	5.4	0.76				
3	Academic Status	65.4	46.1	0.73	0.76			
4	Allocated Time Long Vowels	304	175	0.14	-0.01	-0.06		
5	Allocated Time Other Decoding	783	258	-0.29	-0.32	-0.24	0.25	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.82	(p = 0.00)[a]
Multiple R Squared	0.68	
Std. Error of Est.	3.90	
Constant	3.10	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[a]	Partial Corr. With Dep.
Long Vowels (Pre)	0.4367	0.5422	0.1205	20.24	0.00	0.44
Academic Status	0.3876	0.0565	0.0138	16.86	0.00	0.40
Allocated Time Long Vowels	0.1929	0.0074	0.0024	9.19	0.00	0.31
Allocated Time Other Decoding	-0.1102	-0.0029	0.0017	2.71	0.10	-0.17

Note

To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 91 students (out of 152) representing nine classes were analyzed.

[a] Probabilities rounded to two decimal places.

Table 4.20

Achievement in long vowels (post) regressed on achievement in long vowels (pre), academic status and measures of allocated time (from teacher logs) over the A-B interval (subjects pooled within class, N = 91).

I DESCRIPTIVE INFORMATION

	Variable	Mean[a]	Standard Deviation	Correlations 1	2	3	4	5
1	Long Vowels (Post)	0.0	5.4					
2	Long Vowels (Pre)	0.0	4.8	0.74				
3	Academic Status	0.0	38.2	0.66	0.76			
4	Allocated Time Long Vowels	0	117	0.02	-0.12	-0.08		
5	Allocated Time Other Decoding	0	139	-0.21	-0.24	-0.22	0.22	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.76	(p = 0.00)[b]
Multiple R Squared	0.58	
Std. Error of Est.	3.53	
Constant	0.00	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[b]	Partial Corr. With Dep.
Long Vowels (Pre)	0.5602	0.6198	0.1187	27.24	0.00	0.49
Academic Status	0.2384	0.0334	0.0150	4.99	0.03	0.23
Allocated Time Long Vowels	0.1145	0.0052	0.0033	2.57	0.11	0.17
Allocated Time Other Decoding	-0.0483	-0.0019	0.0028	0.44	0.52	-0.07

Note
To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 91 students (out of 152) representing nine classes were analyzed.

[a] The means of within-class deviation scores are zero.

[b] Probabilities rounded to two decimal places.

positively correlated with the posttest, and slightly negatively correlated with the pretest and academic status. Allocated time in other decoding was negatively correlated with all three test scores.

In the regression analyses, the four independent variables accounted for 68 percent (subjects pooled) and 58 percent (subjects pooled within class) of the posttest variance. Although the analyses were dominated by the pretest, allocated time in decoding-long vowels had a positive regression weight. The effect was stronger for the analyses where subjects were pooled, but in both analyses the partial correlation between allocated time in decoding-long vowels and achievement (post) was quite high (0.31 and 0.17). For the analyses presented in Tables 4.19 and 4.20, allocated time in decoding-long vowels accounted uniquely for 3 and 1 percent of the posttest variance respectively. Time allocated to the other decoding areas yielded a negative weight in both analyses. In the analysis where subjects were pooled the effect was quite strong though much weaker than the effect of time allocated to decoding-long vowels. Since the zero order correlation between the two time variables was positive, the negative weight for time allocated to other decoding was somewhat difficult to explain.

Parallel analyses were computed using estimated engaged time rather than allocated time. The sample on which these analyses were carried out contained 66 students from the 6 classes for which estimates of engaged time were available. The results for subjects pooled and subjects pooled within class are presented in Tables 4.21 and 4.22 respectively. The pattern of intercorrelations among the test scores similar to those presented in Tables 4.19 and 4.20. However the correlations among the

Table 4.21

Achievement in long vowels (post) regressed on achievement in long vowels (pre), academic status and measures of estimated engaged time (from teacher logs) over the A-B interval (subjects pooled, N = 66).

I DESCRIPTIVE INFORMATION

	Variable	Mean	Standard Deviation	Correlations 1	2	3	4	5
1	Long Vowels (Post)	11.6	6.7					
2	Long Vowels (Pre)	8.1	5.5	0.76				
3	Academic Status	71.4	48.0	0.70	0.74			
4	Est. Eng. Time Long Vowels	150	90	0.24	0.03	0.16		
5	Est. Eng. Time Other Decoding	389	259	-0.01	-0.09	0.21	0.47	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.82	(p = 0.00)[a]
Multiple R Squared	0.67	
Std. Error of Est.	4.02	
Constant	2.08	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[a]	Partial Corr. With Dep.
Long Vowels (Pre)	0.5071	0.6237	0.1458	18.30	0.00	0.48
Academic Status	0.3165	0.0444	0.0169	6.89	0.01	0.32
Est. Eng. Time Long Vowels	0.2374	0.0178	0.0063	7.94	0.01	0.34
Est. Eng. Time Other Decoding	-0.1407	-0.0037	0.0024	2.41	0.12	-0.20

Note
To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 66 students (out of 112) representing six classes were analyzed.

[a] Probabilities rounded to two decimal places.

Table 4.22

Achievement in long vowels (post) regressed on achievement in long vowels (pre), academic status and measures of estimated engaged time (from teacher logs) over the A-B interval (subjects pooled within class, N = 66).

I DESCRIPTIVE INFORMATION

	Variable	Mean[a]	Standard Deviation	Correlations 1	2	3	4	5
1	Long Vowels (Post)	0.0	5.3					
2	Long Vowels (Pre)	0.0	5.1	0.76				
3	Academic Status	0.0	40.6	0.64	0.75			
4	Est. Eng. Time Long Vowels	0	74	0.08	-0.01	0.04		
5	Est. Eng. Time Other Decoding	0	94	0.14	0.08	0.16	0.67	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.77	(p = 0.00)[b]
Multiple R Squared	0.59	
Std. Error of Est.	3.53	
Constant	0.00	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[b]	Partial Corr. With Dep.
Long Vowels (Pre)	0.6327	0.6656	0.1314	25.67	0.00	0.54
Academic Status	0.1617	0.0213	0.0166	1.65	0.20	0.16
Est. Eng. Time Long Vowels	0.0712	0.0051	0.0079	0.42	0.53	0.08
Est. Eng. Time Other Decoding	0.0177	0.0010	0.0064	0.03	0.87	0.02

Note

To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 66 students (out of 112) representing six classes were analyzed.

[a] The means of within-class deviation scores are zero.

[b] Probabilities rounded to two decimal places.

test scores and time variables changed quite markedly. The correlation between estimated engaged time in long vowels and estimated engaged time in other decoding increased to 0.47 in Table 4.21 and 0.67 in Table 4.22. Where there were negative correlations between allocated times and test scores there were essentially zero or positive correlations between estimated engaged times and test scores.

In the regression analysis where subjects were pooled there was a positive relationship between estimated engaged time in decoding-long vowels and the posttest. In the same analysis estimated engaged time in the other areas of decoding entered negatively. Both times have sizeable partial correlations with the posttest. When subjects were pooled within class (Table 4.22) neither time variable had much impact on the posttest.

In the analyses of achievement in decoding-long vowels the pretest dominated the relationships. However time in the matched category was positively related to the posttest, especially in analyses where subjects were pooled. A negative relationship occurred between achievement in decoding-long vowels and time in the other decoding areas when subjects were pooled but the relationship disappeared when subjects were pooled within class.

In addition to analyses of relatively narrow content categories (compound words and decoding-long vowels) regressions were run on total decoding which represents a much broader content category and includes much greater amounts of allocated time. In these analyses, time allocated to decoding and all other time allocated to reading were used as independent variables. After trimming the sample to eliminate missing data

and to alleviate ceiling effects 103 cases remained for analyses.

The results for the allocated time measures are presented in Tables 4.23 and 4.24. Note that the correlations among the test scores were extremely high and that time allocated to the matched category correlates negatively with the posttest. Nevertheless the weight for time allocated to decoding was positive in the analysis where subjects were pooled. This weight goes slightly negative in the analysis where subjects were pooled within class. In niether case was the effect very strong. However, when subjects were pooled within class (Table 4.24) the time allocated to other reading had a large positive weight and a substantial partial correlation with posttest.

When parallel analyses were run using estimated engaged time (Tables 4.25 and 4.26), the negative zero order correlations disappeared. These analyses were similar to the analyses using allocated time. The result for estimated engaged time (when subjects were pooled within class) was repeated.

The test score variables in the analyses of decoding were very highly correlated. This condition dominated the analyses. The effect of the matched time category was weak and inconsistent, sometimes yielding positive weights sometimes negative weights. The time in other reading however did have a consistent positive relationship to posttest when subjects were pooled within class.

The broadest content category available for analysis was total reading. All of the reading subscores (exclusive of speeded subtests) were added to form a total reading score containing 301 items (see Table 4.14). After trimming to reduce the ceiling effect and eliminate missing data,

Table 4.23

Achievement in decoding (post) regressed on achievement in decoding (pre), academic status and measures of allocated time (from teacher logs) over the A-B interval (subjects pooled, N = 103).

I DESCRIPTIVE INFORMATION

	Variable	Mean	Standard Deviation	Correlations 1	2	3	4	5
1	Decoding (Post)	45.4	21.6					
2	Decoding (Pre)	34.8	19.7	0.90				
3	Academic Status	89.6	65.3	0.88	0.93			
4	Allocated Time Decoding	1074	359	-0.16	-0.24	-0.19		
5	Allocated Time Other Reading	1802	316	0.02	-0.05	0.01	0.23	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.91	(p = 0.00)[a]
Multiple R Squared	0.83	
Std. Error of Est.	9.14	
Constant	5.19	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[a]	Partial Corr. With Dep.
Decoding (Pre)	0.6277	0.6883	0.1309	27.64	0.00	0.47
Academic Status	0.3036	0.1004	0.0391	6.58	0.01	0.25
Allocated Time Decoding	0.0364	0.0022	0.0027	0.67	0.58	0.08
Allocated Time Other Reading	0.0398	0.0027	0.0030	0.83	0.63	0.09

Note

To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 103 students (out of 152) representing nine classes were analyzed.

[a] Probabilities rounded to two decimal places.

Table 4.24

Achievement in decoding (post) regressed on achievement in decoding (pre), academic status and measures of allocated time (from teacher logs) over the A-B interval (subjects pooled within class, N = 103).

I DESCRIPTIVE INFORMATION

	Variable	Mean[a]	Standard Deviation	Correlations 1	2	3	4	5
1	Decoding (Post)	0.0	17.4					
2	Decoding (Pre)	0.0	16.4	0.87				
3	Academic Status	0.0	55.7	0.85	0.91			
4	Allocated Time Decoding	0	211	-0.16	-0.15	-0.14		
5	Allocated Time Other Reading	0	176	0.35	0.24	0.23	-0.20	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.89	(p = 0.00)[b]
Multiple R Squared	0.80	
Std. Error of Est.	7.98	
Constant	0.00	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[b]	Partial Corr. With Dep.
Decoding (Pre)	0.5636	0.5981	0.1174	25.97	0.00	0.46
Academic Status	0.2996	0.0935	0.0344	7.38	0.01	0.26
Allocated Time Decoding	-0.0057	-0.0005	0.0038	0.02	0.90	-0.01
Allocated Time Other Reading	0.1466	0.0144	0.0047	9.52	0.00	0.30

Note
To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 103 students (out of 152) representing nine classes were analyzed.

[a] The means of within-class deviation scores are zero.

[b] Probabilities rounded to two decimal places.

Table 4.25

Achievement in decoding (post) regressed on achievement in decoding (pre), academic status and measures of estimated engaged time (from teacher logs) over the A-B interval (subjects pooled, N = 72).

I DESCRIPTIVE INFORMATION

	Variable	Mean	Standard Deviation	Correlations 1	2	3	4	5
1	Decoding (Post)	47.6	20.6					
2	Decoding (Pre)	37.0	19.4	0.89				
3	Academic Status	95.8	65.4	0.87	0.93			
4	Est. Eng. Time Decoding	557	331	0.21	0.12	0.14		
5	Est. Eng. Time Other Reading	931	440	0.26	0.20	0.23	0.69	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.91	(p = 0.00)[a]
Multiple R Squared	0.82	
Std. Error of Est.	9.00	
Constant	11.44	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[a]	Partial Corr. With Dep.
Decoding (Pre)	0.6038	0.6407	0.1477	18.81	0.00	0.47
Academic Status	0.2985	0.0940	0.0442	4.53	0.03	0.25
Est. Eng. Time Decoding	0.0853	0.0053	0.0045	1.42	0.24	0.14
Est. Eng. Time Other Reading	0.0104	0.0005	0.0034	0.02	0.88	0.02

Note
To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 72 students (out of 112) representing six classes were analyzed.

[a] Probabilities rounded to two decimal places.

Table 4.26

Achievement in decoding (post) regressed on achievement in decoding (pre), academic status and measures of estimated engaged time (from teacher logs) over the A-B interval (subjects pooled within class, N = 72).

I DESCRIPTIVE INFORMATION

	Variable	Mean[a]	Standard Deviation	Correlations 1	2	3	4	5
1	Decoding (Post)	0.0	16.7					
2	Decoding (Pre)	0.0	16.1	0.86				
3	Academic Status	0.0	56.9	0.84	0.91			
4	Est. Eng. Time Decoding	0	175	0.21	0.18	0.15		
5	Est. Eng. Time Other Reading	0	208	0.36	0.22	0.23	0.54	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.89	(p = 0.00)[b]
Multiple R Squared	0.79	
Std. Error of Est.	7.97	
Constant	0.00	

Independent Variable	Beta, Stand. Coefficient	B, Raw Coefficient	Stand. Error Of B	F To Delete	Probability[b]	Partial Corr. With Dep.
Decoding (Pre)	0.5294	0.5474	0.1406	15.15	0.00	0.43
Academic Status	0.3238	0.0951	0.0400	5.66	0.02	0.28
Est. Eng. Time Decoding	-0.0387	-0.0037	0.0065	0.32	0.58	-0.07
Est. Eng. Time Other Reading	0.1861	0.0149	0.0055	7.33	0.01	0.31

Note

To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 72 students (out of 112) representing six classes were analyzed.

[a] The means of within-class deviation scores are zero.

[b] Probabilities rounded to two decimal places.

86 students remained in the file. The first four rows of Table 4.27 present descriptive statistics for these students on total reading (post), total reading (pre), academic status, and time allocated to reading. Total reading (pre) and academic status are almost identical by definition and not surprisingly their intercorrelation was 0.99 (both when students were pooled and when students were pooled within class). It is also clear that the pre and posttests were very highly correlated. Note that allocated time was essentially uncorrelated with the test scores when subjects were pooled and positively but very weakly correlated to the test scores when subjects were pooled within class.

The fifth row of Table 4.27 presents descriptive data for estimated engaged time. Since estimates of engaged time were available for only six of the nine classes, figures in the bottom row of Table 4.27 were based on 64 subjects. However, note that estimated engaged time was moderately correlated with the test scores and more strongly related to the posttest than with the pretest both when subjects were pooled and when subjects were pooled within class.

Several regression analyses were carried out on these data. Total reading (post) was regressed on total reading (pre) and either time allocated to reading or estimated engaged time in reading. Analyses were completed where subjects were pooled and where subjects were pooled within class. Even though the analyses were dominated by the very large pre-post correlation, all weights for time were positive. The raw regression coefficients were relatively large in the analyses where subjects were pooled within class (0.012 for allocated time in reading and 0.018 for estimated engaged time in reading). In all analyses the

Table 4.27

Means, standard deviations and intercorrelations for achievement in reading and associated measures of instructional time assessed over the A-B interval.

	Variable	N	Mean	Standard Deviation	Correlations[b] 1	2	3	4	5
1	Reading (Post)	86	111.8	66.0 (54.9)[a]		0.90	0.90	0.01	0.30
2	Reading (Pre)	86	70.9	48.2 (40.2)	0.87		0.99	-0.04	0.24
3	Academic Status	86	90.5	56.7 (47.2)	0.87	0.99		-0.03	0.26
4	Allocated Time Reading	86	2879	544 (254)	0.16	0.12	0.12		0.51
5	Est. Engaged Time Reading	64	1509	723 (328)	0.34	0.27	0.26	0.53	

[a] Standard deviations, calculated when students were pooled within class, are shown in parentheses.

[b] Correlations, computed when students were pooled within class, are shown below the major diagonal.

relationships were somewhat stronger between posttest and estimates of engaged time than between posttest and allocated time. In no case did a time variable account uniquely for more than one percent of the variance in total reading. Given that the pre and posttest were so highly correlated, this situation was not unexpected.

The analyses presented to this point all involved achievement scores resulting from testing sessions which provided plenty of time for most students to complete the items. The final analyses to be presented deal with a speeded test of decoding-consonant sounds. This twenty-four item test proved to be very easy for some classes and very difficult for others (see Table 4.14). In fact, students in some classes got almost all the items correct at the pretest. As a result the test operated as a speeded test in some classes but had some the characteristics of a power test in other classes. The class means and standard deviations attest to this fact. Subjects were trimmed from the data to reduce the ceiling effect and to eliminate missing data leaving 105 students for analyses using allocated time variables. Tables 4.28 and 4.29 present the results for speed in decoding consonant sounds (post) regressed on speed in decoding consonant sounds (pre), academic status, time allocated to decoding consonant sounds and time allocated to other decoding. Academic status was as highly correlated with the posttest as with the pretest in both tables. The matched time variable correlated negatively with test scores in both tables whereas time allocated to other decoding correlated about zero with the test scores. In the analyses where subjects were pooled, time allocated to decoding consonant sounds showed a strong negative relationship with the posttest. When subjects were pooled within class, the

Table 4.28

Speed in decoding consonant sounds (post) regressed on speed in decoding consonant sounds (pre), academic status, and measures of allocated time (from teacher logs) over the A-B interval (subjects pooled, N = 105).

I DESCRIPTIVE INFORMATION

	Variable	Mean	Standard Deviation	Correlations 1	2	3	4	5
1	Consonant Sounds (Post)	13.0	6.7					
2	Consonant Sounds (Pre)	8.7	5.2	0.71				
3	Academic Status	85.3	68.1	0.76	0.74			
4	Allocated Time Consonant Sounds	215	162	-0.50	-0.36	-0.38		
				-0.11	0.02	-0.20	-0.02	
5	Allocated Time Other Decoding	842	319					

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.82	(p = 0.00)[a]
Multiple R Squared	0.67	
Std. Error of Est.	3.98	
Constant	8.25	

Independent Variable	Beta, Stand. Coefficient	B, Raw Coefficient	Stand. Error Of B	F To Delete	Probability[a]	Partial Corr. With Dep.
Consonant Sounds (Pre)	0.3193	0.4172	0.1160	12.95	0.00	0.34
Academic Status	0.4312	0.0428	0.0091	21.97	0.00	0.42
Allocated Time Consonant Sounds	-0.2194	-0.0091	0.0026	12.08	0.00	-0.33
Allocated Time Other Decoding	-0.0224	-0.0007	0.0013	0.28	0.60	-0.05

Note

To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 105 students (out of 152) representing nine classes were analyzed.

[a] Probabilities rounded to two decimal places.

Table 4.29

Speed in decoding consonant sounds (post) regressed on speed in decoding consonant sounds (pre), academic status, and measures of allocated time (from teacher logs) over the A-B interval (subjects pooled within class, N = 105).

I DESCRIPTIVE INFORMATION

	Variable	Mean[a]	Standard Deviation	Correlations 1	2	3	4	5
1	Consonant Sounds (Post)	0.0	5.8					
2	Consonant Sounds (Pre)	0.0	4.4	0.71				
3	Academic Status	0.0	57.3	0.70	0.70			
4	Allocated Time Consonant Sounds	0	103	-0.41	-0.44	-0.38		
5	Allocated Time Other Decoding	0	156	-0.05	0.02	-0.07	0.39	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.77	$(p = 0.00)^b$
Multiple R Squared	0.59	
Std. Error of Est.	3.80	
Constant	0.00	

Independent Variable	Beta, Stand. Coefficient	B, Raw Coefficient	Stand. Error Of B	F To Delete	Probability[b]	Partial Corr. With Dep.
Consonant Sounds (Pre)	0.4057	0.5357	0.1273	17.71	0.00	0.39
Academic Status	0.3767	0.0381	0.0092	17.01	0.00	0.38
Allocated Time Consonant Sounds	-0.0890	-0.0051	0.0045	1.23	0.27	-0.11
Allocated Time Other Decoding	0.0046	0.0002	0.0027	0.00	0.95	0.01

Note

To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 105 students (out of 152) representing nine classes were analyzed.

[a] The means of within-class deviation scores are zero.

[b] Probabilities rounded to two decimal places.

relationship was considerably weaker but still negative. Allocated time in other decoding had weights approximately equal to zero in both analyses. On examination of the class means, it became clear that most of the negative effect was produced by Classes 8 and 9 which had near zero or negative test score gains and by far the largest amounts of allocated time (see Table 4.14).

When parallel analyses were run using estimated engaged time, Classes 7, 8 and 9 were dropped since no observation data were available for them. Results of these analyses are contained in Tables 4.30 and 4.31. The correlations between estimated engaged time in decoding consonant sounds and the test scores were essentially zero when subjects were pooled but remained negative when subjects were pooled within class. Estimated engaged time in other decoding was positively correlated with the test scores in both cases. The regression analyses showed a rather different pattern of results from those using allocated time variables. Three of the weights for time were positive and one was negative; but no time variable accounted for a significant amount of posttest variance nor correlated highly with the posttest when the other independent variables were partialled out.

Considering all of the analyses of the speeded test scores, academic status dominated the relationship when subjects were pooled, and academic status and pretest were more or less equally related to the posttest when subjects were pooled within class. For allocated time a negative relationship with posttest occurred when subjects were pooled. This effect was due to between class variance since the effect was much weaker when subjects were pooled within class. When analyses were run

Table 4.30

Speed in decoding consonant sounds (post) regressed on speed in decoding consonant sounds (pre), academic status, and measures of estimated engaged time (from teacher logs) over the A-B interval (subjects pooled, N = 77).

I DESCRIPTIVE INFORMATION

	Variable	Mean	Standard Deviation	Correlations 1	2	3	4	5
1	Consonant Sounds (Post)	14.0	6.2					
2	Consonant Sounds (Pre)	8.9	5.2	0.68				
3	Academic Status	92.5	69.5	0.73	0.71			
4	Est. Eng. Time Consonant Sounds	80	52	0.04	-0.03	-0.02		
				0.20	0.29	0.10	0.48	
5	Est. Eng. Time Other Decoding	472	311					

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.77	$(p = 0.00)^a$
Multiple R Squared	0.59	
Std. Error of Est.	4.12	
Constant	5.72	

Independent Variable	Beta, Stand. Coef-ficient	B, Raw Coef-ficient	Stand. Error Of B	F To Delete	Proba-bility[a]	Partial Corr. With Dep.
Consonant Sounds (Pre)	0.3154	0.3781	0.1392	7.38	0.01	0.30
Academic Status	0.5003	0.0449	0.0098	20.84	0	0.47
Est. Eng. Time Consonant Sounds	0.0414	0.0050	0.0106	0.22	0.65	0.06
Est. Eng. Time Other Decoding	0.0372	0.0007	0.0019	0.16	0.69	0.05

Note
To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 77 students (out of 112) representing six classes were analyzed.

[a] Probabilities rounded to two decimal places.

Table 4.31

Speed in decoding consonant sounds (post) regressed on speed in decoding consonant sounds (pre), academic status, and measures of estimated engaged time (from teacher logs) over the A-B interval (subjects pooled within class, N = 77).

I DESCRIPTIVE INFORMATION

	Variable	Mean[a]	Standard Deviation	Correlations 1	2	3	4	5
1	Consonant Sounds (Post)	0.0	5.5					
2	Consonant Sounds (Pre)	0.0	4.2	0.64				
3	Academic Status	0.0	59.1	0.65	0.67			
4	Est. Eng. Time Consonant Sounds	0	42	-0.12	-0.21	-0.20		
5	Est. Eng. Time Other Decoding	0	141	0.25	0.18	0.21	0.62	

II SUMMARY OF MULTIPLE REGRESSION ANALYSIS

Multiple R	0.72	(p = 0.00)[b]
Multiple R Squared	0.51	
Std. Error of Est.	3.94	
Constant	0.00	

Independent Variable	Beta, Stand. Coefficient	B, Raw Coefficient	Stand. Error Of B	F To Delete	Probability[b]	Partial Corr. With Dep.
Consonant Sounds (Pre)	0.3580	0.4634	0.1472	9.91	0.00	0.35
Academic Status	0.3612	0.0336	0.0106	9.97	0.00	0.35
Est. Eng. Time Consonant Sounds	-0.0714	-0.0092	0.0152	0.37	0.55	-0.07
Est. Eng. Time Other Decoding	0.1565	0.0061	0.0046	1.77	0.18	0.16

Note

To provide complete data and to reduce ceiling effects a relatively large number of cases were trimmed from the sample. Data on 77 students (out of 112) representing six classes were analyzed.

[a] The means of within-class deviation scores are zero.

[b] Probabilities rounded to two decimal places.

Table 4.32

Summary of Results of Regression Analysis for Time Variables and Grade 2 Reading Achievement

I RESULTS FOR OA-OB PERIOD (2 weeks)			Subjects Pooled			Subjects Pooled Within Class		
Dependent Variable	Matched Time Variable	Related Time Variable	Raw Reg. Coefficient	Standard Error of B	Unique Variance Accounted for or Time Variable[a]	Raw Reg Coefficient	Standard Error of b	Unique Variance Accounted for by Time Variable[a]
Compound Words (OB)	Engaged Time Compound Words	Engaged Time Other Word Structure	.0054/-.0327	.0171/.0445	0.1/0.7	.0177/-.0530	.0204/.0509	1.2/1.6
II RESULTS FOR A-B PERIOD (8 weeks)								
Compound Words (B)	Allocated Time Compound Words	Allocated Time Other Word Structure	.0031/.0034	.0110/.0041	1.3/0.6	.0246/-.0009	.0150/.0062	3.7/0.0
Compound Words (B)	Est. Eng. Time Compound Words	Est. Eng. Time Other Word Structure	-.0091/.0113	.0249/.0077	0.3/3.0	.0418/.0050	.0359/.0098	3.7/0.4
Long Vowels (B)	Allocated Time Long Vowels	Allocated Time Other Decoding	.0074/-.0029	.0024/.0017	2.7/1.0	.0052/-.0019	.0033/.0028	1.1/0.2
Long Vowels (B)	Est. Eng. Time Long Vowels	Est. Eng. Time Other Decoding	.0178/-.0037	.0063/.0024	3.1/1.3	.0051/.0010	.0079/.0064	0.7/0.0
Decoding (B)	Allocated Time Decoding	Allocated Time Other Reading	.0022/.0027	.0027/.0030	0.2/0.2	-.0005/.0144	.0038/.0047	0.1/2.0
Decoding (B)	Est. Eng. Time Decoding	Est. Eng. Time Other Reading	.0053/.0005	.0045/.0034	0.8/0.0	-.0037/.0149	.0065/.0055	0.3/2.4
Reading (B)[b]	Allocated Time Reading		.0058	.0059	0.2	.0123	.0118	0.3
Reading (B)[b]	Est. Eng. Time Reading		.0079	.0051	0.8	.0179	.0108	1.1
Consonant Sounds - Speeded (B)	Allocated Time Consonant Sounds	Allocated Time Other Decoding	-.0091/-.0007	.0026/.0013	4.0/0.1	-.0051/.0002	.0045/.0027	0.6/0.0
Consonant Sounds - Speeded (B)	Est. Eng. Time Consonant Sounds	Est. Eng. Time Other Decoding	.0050/.0007	.0106/.0019	0.4/0.1	-.0092/.0061	.0152/.0046	0.1/1.2

[a] For matched time variables this column gives the percent of variance in the dependent variable uniquely accounted for after pretest and academic status have been entered. For related time variables this column gives the percent of variance in the dependent variable accounted for after pretest, academic status and the matched time variable have been entered.

[b] The regressions carried out on reading scores did not include the academic status variable or a related time variable.

using estimated engaged time, the time variables were weakly related to posttest. The one exception was a relatively weak negative relation between matched time and posttest when subjects were pooled within class.

Summary. A summary of the regression analyses is presented in Table 4.32. An examination of the raw regression coefficients for time variables where the dependent variable was a power test, revealed that 15 of the 18 coefficients were positive. The coefficients associated with estimated engaged time were generally larger than the corresponding coefficients associated with allocated time. With the exception of the decoding results, the coefficients obtained in analyses where subjects were pooled within class were greater than those obtained in corresponding analyses where subjects were pooled. The percentages of variance accounted for uniquely by time variables were quite small. Given the general pre-post correlations and academic status-post correlations, this situation was not unexpected.

The results from the speeded test were somewhat puzzling. In analyses where subjects were pooled, the weights associated with allocated time were negative; however the analagous weights for estimated engaged time were positive. When subjects were pooled within class, the matched times were negatively weighted but related times were non-negatively weighted.

V DISCUSSION

Characteristics of Teacher Allocated Time Logs

The data on allocated time were collected via teacher logs. For all analyses over the A-B period, this data source was of central importance. The distributions of allocated time by content category and by setting combination were taken directly from the teacher logs. Allocated time from the teacher logs was the major independent variable in the analyses of the time-achievement relationship. In addition, all calculations of estimated engaged time depended upon the teacher logs. Since the log procedure was central to the current study and since portions of the Phase III-B study will include collection of data on allocated time, a number of features of the teacher logs warrant discussion.

Several practical features of the logs worked quite well. The format was brief and readily understood by the teachers. The logs were filled out in a relatively short period of time even though data were collected for many students in each classroom and the number of specific reading content categories was large. The system was flexible, in that, allocated time was coded in classrooms with very different structures and degrees of individualization of instruction. Teachers who grouped students for instruction found the forms easy to use and teachers who operated highly individualized classes found that the procedure could be readily adapted.

The accuracy of the data provided by the teacher logs was investigated by comparison with the daily logs maintained by the observers.

Interpretation of comparisons within content categories between these two sources of log data was hampered by two factors. The two sources of log data were categorized at different levels of content (teacher logs used specific content categories while observer logs used general content categories). In addition, the two log procedures used different content coding strategies (teacher logs used multiple coding, and observer logs employed focus coding). However, for total time allocated to reading, differences due to level of content and coding strategy were irrelevant.

Comparisons of total allocated time in reading from teacher logs with that from observer logs were available for six of the nine classes (since only six of the classes were observed). The correlations between the two sources of allocated time were high (0.94 or greater) within three of the classes, moderate (about 0.67) in two classes and low (0.29) in one class. Hence, in five of the six classes, the two log procedures ranked students similarly on total time allocated to reading. However, the mean amount of allocated time differed considerably between teacher and observer logs in five of the six classes.

Within content categories the correlations between the two sources of allocated time remained moderately high for most classes. Class 1 was an exception, in that, more than half of the correlations between the two sources of allocated time for content areas were negative even though the correlation between sources when content areas were collapsed was moderately high. Again the mean differences for time allocated to content categories differed considerably between teacher and observer logs. In most classes there was moderate to good agreement between the

two sources of log data on content categories where instruction did not occur.

A possible source of error in the teacher logs was the inconsistency with which some logs were returned to the Far West Laboratory. Logs were to be returned weekly, although the records themselves were entered daily. Some teachers required reminders to return the logs; and, in these cases, it seems safe to assume that the logs might have been completed considerably after the time when the instruction occurred. The intervening time could have varied from one day to one or more weeks. The use of prestamped and preaddressed envelopes did not eradicate this problem.

If teachers completed logs well after the instruction occurred, they probably relied heavily on lesson plans for the details of instruction. This hypothesized use of lesson plans (which may or may not have reflected the actual instruction accurately) could well have affected more logs than those which were returned late. In addition, the project staff referred to the logs as "lesson plan logs," which may have influenced teachers. In future work, the logs may be improved by devising procederes to ensure that they are recorded regularly, and are clearly differentiated from the lesson plans which many school districts require as part of their regular operating procedure.

The coding differences (focus vs. multiple) which were discussed earlier can be eliminated quite easily. In future, independently collected samples of allocated time data using the same coding strategy as the teacher logs must be obtained. It is important to note, however, that the choice of coding strategy may have strong consequences for detection of a relationship between time and learning.

The training of teachers in the use of the logs was conducted on a one to one basis. In future, it would be more efficient to provide one or more group sessions to give a common introduction to the procedures. These sessions could be followed up with one to one meetings in the schools to discuss clarification and possible adaptations arising from practice logs.

No data were available to check the logs within all specific content categories. In addition, no assessment of the characteristics of the setting codes recorded in teacher logs has been made. These points notwithstanding, the teacher logs compared reasonably well with observer logs and with refinements can be used to collect useful information on allocation of instructional time.

Results of the comparisons between allocated time from teacher logs and engaged time from direct observation varied from class to class. Three of the classes (1, 2, and 3) had relatively high correlations between allocated time from teacher logs and engaged time from direct observations while classes 4, 5, and 6 showed moderate correlations. In two of the six classes, the correlation between allocated time from teacher logs and engaged time from direct observation was higher than the correlation between allocated time from teachers logs and allocated time from observer logs.

The allocated time from teacher logs was adjusted by weighting each student's time by a rating of attentiveness. Ratings were made by the teacher for each student individually. When the adjusted allocated times (collapsed over content categories) were correlated with engaged time from direct observation, four of the classes yielded relatively high

coefficients, one was moderately high, and one was approximately zero. In three of the six classes the correlation between engaged and allocated time was higher after the adjustment. In the other three classes the correlations were lower. In the majority of cases the adjustment brought the mean allocated time closer to the mean observed engaged time.

Allocation of Instructional Time in Reading

The mean total time allocated to reading for the 40 day instructional period varied from approximately 2,450 to 6,000 minutes across the nine classes. That is, in the most extreme case one class was averaging almost 2.5 times more time allocated to reading compared to another class. Given that the logs were not error free, this still represented a remarkable difference. The variation between classes in time allocated to reading was greater than the variation within class.

The pattern of allocation to general and specific content categories was partly a function of the time during the year when the data were collected. The period including October and November represented the major portion of instruction before the Christmas break, however, the selection of a different two month period would have generated a different pattern of time allocation to content areas.

On the average, one-third of the reading time was allocated to decoding. About 23 percent of reading time was allocated to "areas related to reading." Within this general content category dictionary skills, grammar, and creative writing received the most time. The general content categories labeled comprehension, reading practice and miscellaneous each accounted for approximately 10 percent of the time

allocated to reading. At the level of general content categories there was some similarity in the pattern of allocation from class to class. However, the general content categories were not ranked in the same way for any pair of classes. At the level of specific content categories, patterns were difficult to discern. Only one category (foreign language) received no time allocation from any class. Within the general and specific content categories the variation between classes was greater than the variation within classes. The variability within class was due in part to student absenteeism and partly to differential allocations within class. Most classes had several reading groups and these groups were often allocated time in different content areas.

There were large differences, in the distributions of allocated time across classes. These differences, in and of themselves, may or may not be important. It remains to be seen whether the differences in time allocation were appropriate. For example, if a class had mastered a particular content area, then large allocations of time to that area would not have been warranted. On the other hand, if a class or some of its members performed at a low level in a particular content area, some time probably should have been allocated to that area.

The allocation of time to setting combinations within reading revealed three patterns. Class 1 allocated time only to settings wherein a teacher was directly involved. In this case time was allocated to each of the four possible settings with teacher involvement. Class 4 allocated about 85 percent of the time in reading to the "large group seatwork with adult present" setting and about 15 percent to the "large group seatwork without an adult present" setting. This class operated essentially in two settings. The other seven classes allocated

substantial amounts of time to most of the settings.

Across classes, much more time was allocated to settings where adults were directly involved than to settings where no adult was directly involved, and much more time was allocated to seatwork settings as opposed to non-seatwork settings. Time was allocated about equally to large and small groups. In almost all cases there was more variation between classes than within classes.

Students were engaged in on-task activities for approximately half of the time allocated to reading; however, there were large differences both between and within classes. This figure was obtained by direct observation in six of the nine classes. Student attentiveness was also assessed by teacher ratings. These ratings correlated relatively highly with academic status but weakly and inconsistently with the observed engagement rates which, in turn, correlated weakly with academic status. In this sample, the teacher ratings were apparently biased by teacher perception of student ability, but observed student engagement was not independent of teacher ratings and academic status.

Instructional Time and Student Achievement

Multiple regression analyses relating student achievement and instructional time were reported. The results were quite complex, however several points bear comment.

In the main, instructional time variables were positively related to student achievement. That is, where students spent more time, achievement was higher. There were several exceptions to this statement, especially for the analyses carried out on the speeded test. The latter analyses will be discussed later in this section.

Each analysis was carried out with subjects pooled and then repeated with subjects pooled within class. In general, instructional time variables showed stronger effects when subjects were pooled within class than when subjects were pooled. This implied that if a student spent more time (relative to the mean time spent for his class) then his achievement tended to be higher than the mean achievement for his class. An analogous statement can be made about time and achievement relative to the means for the whole sample (regardless of class membership) but the effect tended to be smaller than that found when subjects were pooled within class. For this sample of classes, the variation in average class time in instruction was not strongly related to average class differences in achievement. This could have resulted in a number of ways; for example, differential effectiveness of teachers and/or curricula, or the allocation of time (in some classes) to content areas after the students had mastered the areas. It was not within the scope of the present data set to pursue these or other possibilities. The point here is that, within a given class more time was associated with more learning. Differences between classes in amount of instructional time were also weakly related to achievement.

Analyses were carried out on allocated time and subsequently the analyses were repeated (on a subsample) using estimated engaged time. The relationship between time and achievement was stronger when estimated engaged times were used than when allocated time was used. Even though the estimation of engaged time was somewhat crude, engaged time appeared to be more highly related to student achievement than allocated time.

The content areas chosen for analysis were purposely varied in "breadth." Compound words was the narrowest category chosen, in that,

the knowledge to be acquired in the area was relatively small in amount and relatively simple in structure. The long vowels category was somewhat broader in that the concepts involved were more complicated and were also more closely tied to other content categories (for example, short vowels and other decoding categories). The total decoding and total reading categories were broader still. The results for the broadest category (reading) and the narrowest category (compound words) followed the trends (more or less) described above. The results from the two decoding categories were somewhat weaker. A logical analysis of the test items used to assess decoding, pointed out that instruction in decoding may be helpful but not necessary for answering the items correctly. Therefore students who were not in a phonics-type program could certainly get the items correct even though they had small amounts of time allocated to decoding tasks. In reading, this situation makes it particularly difficult to isolate pieces of instructional time which relate uniquely to performance on paper and pencil tests. There was clearly considerable transfer of knowledge from one content area to another. In addition, the broader the content area the greater the potential overlap. The data bore this out, especially in the decoding area. Note that time in other reading was a strong contributor to achievement (when students were pooled within class). The results for decoding-long vowels employed time in other decoding as the secondary time variable. Having recognized this transfer phenomenon, time in other reading may have been a more useful choice for the secondary time variable in the analysis.

The analysis of one speeded test (decoding-consonant sounds) was reported. The results were conflicting. Half of the regression

coefficients for time variables were positive; half were negative. An examination of the item difficulties by class revealed that in some classes the test performed as a speeded test. The items were very easy and hence the number right was mostly a function of speed of response. However, in several classes the item difficulties were relatively low, so that the test did not perform as a speeded test. This fact seriously clouds the interpretation of the analysis. No substantial conclusions were drawn from analyses of the speeded test.

The findings reported on the relationship between instructional time and achievement were derived from exploratory analyses. Alternative analysis plans might or might not replicate the results. The underlying model relating time and other factors to learning remains unclear. In the analysis reported here, no consideration was given to possible nonlinear relationships. Given more time and resources, a number of interesting hypotheses could be explored. A conceptually simple and intuitively appealing approach assumes that learning is the product of some learning rate and time. With a zero learning rate or no time, no learning takes place. Where learning rate is constant, learning is a function of time; where time is constant, learning is a function of learning rate. Equal amounts of learning may occur as the result of a small amount of time and a high learning rate, or vice versa. The major difficulty with this notion is the complexity of the "learning rate" concept. Presumably learning rate is a function of the person and of the learning task. This example of a product model (or others) was not explored for this report.

The way in which content areas are subdivided and categorized affects

the relationship between time and achievement. In this study, reading instruction was partitioned into mutually exclusive categories. Achievement tests corresponding to the categories were developed, and relationships were sought between achievement and time within the same category. This appears to be the place to start; however, the results and the previous discussion point out the difficulty of developing consistent and meaningful content categories. The greater the transfer effects in a subject area, the more complex the relation between time-in-content and achievement. It would appear that some subject areas are more amenable to useful content categorization than others (when usefulness is defined in terms of the relationship to paper and pencil test scores). A slight variation on the transfer issue concerns the relative impact of out-of-school experience on achievement. Of the academic areas taught in elementary school, reading is probably influenced more by out-of-school experience than other subject areas. This speculation does not invalidate the time to achievement relationship, but it may make the relationship more complex and difficult to investigate empirically. It is tempting to redefine the content categories and to hierarchially structure the manner in which they should be related to a given achievement measure. Several simple redefinitions have been reported; many other plausible alternatives could also be tried.

The results of this study must, in general, be carefully qualified for a number of reasons. The achievement measures were relatively short, and therefore prone to sizeable measurement errors. There were severe ceiling effects on many of the scales. Hence, the samples on which analyses were conducted usually included from 50 to 80 percent of the

students with complete data. Only a few classes were involved; nine for analyses of allocated time and six for analyses of estimated engaged time. In addition the correlations between test scores were high. The time variables accounted uniquely for small portions of posttest variation. This fact was, at least partly, a function of the multi-colinearity. In addition, the teacher log-keeping procedures and the direct observation procedures contained relatively large errors.

Summary and Conclusions

The assessment of allocated time by teacher logs was reasonably successful. The allocated time data collected from teachers compared moderately well with data collected by Far West Laboratory observers. In future work, it is recommended that fewer content categories be used; that teachers be brought to a central location for training on log procedures, that steps be taken to ensure that teachers complete the logs daily, and that a sample of allocated time data be collected independently with identical coding procedures for subsequent comparison purposes.

The observation procedure indicated that engaged time can be reliably assessed for grade two students. It is recommended that complete school days be sampled during observation. However, since the testing over a two-week period did not yield reliable gains on most scales, it is recommended that observation days be spaced over a longer period of time. For analysis of reading scores, one day of observation per week over a minimum of eight weeks is recommended.

There were substantial differences in time allocated to reading both

between and within classes. A considerable amount of the within class variation was due to student absenteeism. Classes varied remarkably on the distribution of time spent on content categories as well as time spent in particular setting combinations. No single setting combination characterized all of the classes. Students were engaged in reading activities about 50 percent of the time that was allocated to reading. However, there were large variations both between and within classes. Teacher ratings of student attentiveness were weakly related to observed engagement rates. Teacher ratings alone should not be relied on as the major assessment of students engagement.

Instructional time and student achievement were positively related. The strength and consistency of the relationship varied considerably. Ceiling effects on the tests prompted relatively severe trimming of subjects from the sample. It is recommended for future work, that students be selected so that the range on entering achievement is restricted. This will tend to avoid ceiling effects and to reduce pre-post correlations.

REFERENCES

Bennett, N. Teaching styles and pupil progress. London: Open Books, 1976.

Block, J., & Burns, R. Time in school learning: An instructional psychologist's perspective. Paper presented at the annual meeting of the American Educational Research Association, Washington, D.C., 1975.

Bloom, B. S. Learning for mastery. UCLA Evaluation Comment, 1968, 1, 1-12.

Bond, G. L., & Dykstra, R. The cooperative research program in first-grade reading instruction. Reading Research Quarterly, 1967, 2, 5-142.

Carroll, J. B. A model of school learning. Teachers College Record, 1963, 64, 723-733

Carroll, J. B., & Spearitt, D. A study of a model of school learning. Monograph No. 4, Center for Research and Development in Educational Differences, Harvard University, 1967. (ERIC Document Reproduction Service No. ED 045 477)

Cronbach, L. J. Coefficient alpha and the internal structure of tests. Psychometrika, 1951, 16, 297-334.

Cronbach, L. J., & Webb, N. Between-class and within-class effects in a reported aptitude X treatment interaction: Reanalysis of a study by G. L. Anderson. Journal of Educational Psychology, 1975, 67, 717-724.

David, J. L. Summer study: A two part investigation of the impact of exposure to schooling on achievement growth. Unpublished doctoral dissertation, Harvard University, 1974.

Dunkin, M. J., & Biddle, B. J. The study of teaching. New York: Holt, Rinehart, and Winston, 1974.

Far West Laboratory for Educational Research and Development. Program plan for continuation of Phase III-A: Beginning Teacher Evaluation Study. San Francisco, 1975.

Filby, N. N., & Dishaw, M. Development and refinement of reading and mathematics tests for the study of reading and mathematics instruction in Grades 2 and 5 (Technical Report III-1). Beginning Teacher Evaluation Study, Far West Laboratory, San Francisco, 1975.

Filby, N. N., & Dishaw, M. Refinement of reading and mathematics tests through an analysis of reactivity (Technical Report III-6). Beginning Teacher Evaluation Study, Far West Laboratory for Educational Research and Development, San Francisco, 1976.

Fisher, C. W. A study of instructional time in grade 2 mathematics (Technical Report II-3). Beginning Teacher Evaluation Study, Far West Laboratory for Educational Research and Development, San Francisco, 1976.

Gage, N. L. (Ed.), Handbook of research on teaching. Chicago: Rand McNally and Company, 1963.

Harnischfeger, A., and Wiley, D. Teaching-learning processes in elementary school: A synoptic view (Technical Report 75-31-1), San Francisco: Far West Laboratory, 1975.

Harris, A. J., Morrison, C., Serwer, B., and Gold, L. A continuation of the CRAFT project: Comparing reading approaches with disadvantaged urban Negro children in primary grades. New York: City University of New York, 1968. (ERIC Document Reproduction Service No. ED 010 297)

Harris, A. J., & Serwer, B. Comparison of reading approaches in first grade teaching with disadvantaged children. (The CRAFT project) New York: City University of New York, 1966.

Hess, R. & Takanishi, R. The relationship of teacher behavior and school characteristics to student enagagement (Technical Report 42). Center for Research and Development in Teaching, Stanford University, 1974.

Karweit, N. Quantity of schooling: A major educational factor? Educational Researcher, 1976, 5 (2), 15-17.

Shanker, A. Research on teaching methods: British study gives first hard data. New York Times, May 16, 1976.

Stallings, J. A. Relationships between classroom instructional practices and child development. Paper presented at the annual meeting of the American Educational Research Association, Washington, D.C., 1975.

Stallings, J. A., & Kaskowitz, D. Follow-through classroom observation evaluation, 1972-1973. Menlo Park, California: Stanford Research Institute, 1974.

Thorndike, R. L. (Ed.) Educational measurement (2nd Ed.). Washington, D.C., American Council on Education, 1971.

Travers, Robert M. W. (Ed.), Second handbook of research on teaching. Chicago: Rand McNally and Company, 1973.

Wiley, D. E. Another hour, another day: Quantity of schooling, a potent path for policy. Studies of Educative Processes, No. 3. Chicago, July, 1973.

APPENDIX A

Directions and Examples of Items from Achievement Tests

General Instructions to Testers

Winter Testing, 1975

Teachers

The teacher will be in the room during the testing, mainly to help maintain order. If all is going well, the teacher may work on other things. The BTES staff member is in all cases responsible for administering the test.

At the beginning of the test session, give the teacher a copy of the tests, Say something like "YOU MIGHT WANT TO LOOK THROUGH A COPY OF THE TEST." Let the teacher keep the test during the test session, but be sure to get the test back at the end of the session. Do not let the teacher keep a copy of the test.

Circulating to Check (Not to Help!)

During the testing, it will be necessary to circulate around the room, making sure that students have understood the directions correctly. A student who is confused may raise his hand for help. If this happens (or if you see a child who is not following directions), repeat the instructions to the child. You may point out to him where he is supposed to read and mark. But do not help him answer the questions. And do not read any words for the child during the reading tests.

The teacher may want to help circulate and answer questions. This is permissable as long as the teacher understands that he may only repeat the instructions and may not read words for the child nor try to explain the task more clearly.

Frustrated Children

Some children at lower levels will find the exercises frustrating. Try to encourage such children to figure out what they can. Say something like:

> I KNOW SOME OF THE QUESTIONS ARE DIFFICULT. MAYBE YOU HAVEN'T LEARNED SOME OF THESE THINGS YET. YOU ARE HELPING US FIND OUT WHICH THINGS ARE HARD TO DO. TRY TO FIGURE OUT WHATEVER YOU CAN ON YOUR OWN.

Time Limits

The time limits given for each subtest represent the maximum working time allowed for students after the directions have been given. These times are guidelines, and some leaway is allowed, but it is important not to start running long on each subtest, or total time will be unduly extended. We expect that, in most classes, the majority of students will finish within these limits, while a few students will consistently be slow. When you have to stop students before they finish, tell them:

> IT IS TIME TO STOP. (OR TIME TO GO ON.) IT'S OK IF YOU DIDN'T FINISH. WE JUST WANT TO SEE HOW PEOPLE DO ON THESE EXERCISES.

Try to keep the classroom atmosphere work-oriented but not high-pressured.

Guessing

Do not encourage students to guess randomly. Tell them:

> WORK OUT THE ANSWER AS BEST YOU CAN. THERE MAY BE SOME THINGS YOU DON'T KNOW. IF YOU CAN'T DO IT AT ALL, JUST LEAVE IT BLANK.

Preparation

Past experience has shown the importance of being well prepared for the onslaught of an active group of children. A good strong cup of coffee is often much more valuable than ten more minutes' sleep.

Materials Needed

The tester should go out into the field with:

- test booklets
- scratch paper (2 pieces per student, math only)
- extra pencils
- class list and record form
- watch with second hand
- rubber band

The tester should return to Faye Mueller (phone 565-3011):

- test booklets
- class list
- filled in record form

} enclosed in rubber band

EXAMPLE OF SPECIFIC INSTRUCTIONS FOR TEST
Booklet 2A2 (Decoding)

Make sure that desks are clear and that the students are seated some distance apart.

> GOOD MORNING. TODAY WE ARE GOING TO DO SOME READING PROBLEMS SIMILAR TO THOSE WE DID ON _____. WHEN YOU RECEIVE YOUR BOOKLET, FILL IN YOUR NAME WITH YOUR LAST NAME FIRST. PLEASE DO NOT OPEN THE BOOKLET.

Pass out booklets and pencils as needed. When children have finished writing their names, state:

Pages 1 - 3 Speed Test (1 minute)

> OPEN YOUR BOOKLETS TO PAGE 1. WE'RE GOING TO DO SOMETHING A LITTLE DIFFERENT TODAY, SO LISTEN CAREFULLY. THE DIRECTIONS SAY: LOOK AT THE PICTURE. READ THE WORDS CAREFULLY. CIRCLE THE WORD THAT NAMES THE PICTURE.
>
> DO YOU REMEMBER THESE PICTURES FROM LAST TIME? THE FIRST PICTURE IS DOG AND THE WORD DOG IS CIRCLED. LET'S DO THE NEXT ONE. WHAT IS THE PICTURE?....RIGHT, TREE. READ THE WORDS AND CIRCLE THE WORD TREE.....LET'S DO THE LAST ONE. WHAT IS THE PICTURE?.....RIGHT, SING. CIRCLE THE WORD SING.....
>
> NOW, PUT DOWN YOUR PENCILS SO YOU CAN LISTEN TO THE WAY WE'RE GOING TO DO THIS TODAY. PUT DOWN YOUR PENCILS. LOOK AT ME SO I'LL KNOW YOU ARE READY TO LISTEN. YOU'RE GOING TO DO 2 PAGES OF PICTURES JUST LIKE THIS. BUT YOU WILL HAVE JUST ONE MINUTE TO DO BOTH PAGES. YOU WILL NEED TO WORK QUICKLY BUT CAREFULLY. WHEN I SAY GO, TURN THE PAGE AND START. REMEMBER TO DO BOTH PAGES. WHEN I SAY STOP, PUT YOUR PENCILS DOWN. IS

EVERYONE READY?.....GO.

Time for exactly one minute.

STOP. PUT YOUR PENCILS DOWN. WE HAVE FINISHED THIS PART OF THE BOOKLET. PLEASE DO NOT TURN BACK TO THIS PART.

Page 4 - 5 (4 minutes)

THE DIRECTIONS SAY: READ THE SENTENCE OR STORY. LOOK AT THE UNDERLINED WORD. FIND THE WORD OR PHRASE THAT MEANS THE SAME THING AS THE UNDERLINED WORD. CIRCLE THE LETTER OF YOUR ANSWER.

LOOK AT EXAMPLE A. LISA TRIED TO OPEN THE WINDOW. IT WAS STUCK. WHAT DOES IT MEAN? A. LISA WAS STUCK? B. THE WINDOW WAS STUCK? C. OPEN WAS STUCK? WHAT DOES IT MEAN?.....IT MEANS THE WINDOW. SO LETTER B IS CIRCLED.

LET'S DO THE NEXT ONE TOGETHER. LOOK AT EXAMPLE B. IT SAYS: TIM'S MOTHER CALLED HIM FOR DINNER. HE WAS VERY HUNGRY. WHAT DOES HE MEAN? A. MOTHER, B. TIM, C. DINNER. WHAT DOES HE MEAN?.....RIGHT, HE MEANS TIM. TIM WAS HUNGRY. WHAT LETTER IS IN FRONT OF THE ANSWER TIM?...RIGHT, B. CIRCLE THE LETTER B.

DOES EVERYONE UNDERSTAND? ....

YOU DO THE REST OF PAGES 4 AND 5 ON YOUR OWN, THEN STOP AND WAIT. LOOK UP AT ME WHEN YOU FINISH. YOU MAY BEGIN.

Circulate to be sure students do both pages.

Page 6 (3 minutes)

ON THIS PAGE WE'RE GOING TO WORK ON CONTRACTIONS. THERE ARE 2 KINDS OF QUESTIONS. LOOK AT THE FIRST ONE, EXAMPLE A. THE DIRECTIONS SAY: FIND THE TWO WORDS THAT MAKE UP THE CONTRACTION. CIRCLE THE LETTER OF YOUR ANSWER. THE UNDERLINED CONTRACTION IS HE'S. THE CONTRACTION HE'S IS MADE FROM THE WORDS HE IS, SO LETTER B IS CIRCLED. LOOK AT EXAMPLE B. THE DIRECTIONS SAY: FIND THE RIGHT CONTRACTION FOR THE TWO WORDS. THE TWO WORDS UNDERLINED ARE HE IS. WHAT IS THE CONTRACTION OF HE IS?.....RIGHT. HE'S. HE IS BECOMES HE'S, SO LETTER C IS CIRCLED. YOU DO THE REST OF THIS PAGE, THEN STOP AND WAIT. LOOK UP AT ME WHEN YOU FINISH. YOU MAY BEGIN.

Pages 7 - 8 (6 minutes)

> THE DIRECTIONS SAY: READ THE SENTENCE OR STORY. LOOK AT THE UNDERLINED WORD. THE SENTENCE OR STORY HELPS TO TELL YOU THE MEANING OF THE UNDERLINED WORD. CHOOSE THE BEST DEFINITION. CIRCLE THE LETTER OF YOUR ANSWER.
>
> LOOK AT THE EXAMPLE. IT SAYS: I SAW THE KITTEN IN THE BOX. WHAT DOES SAW MEAN? A. CUT, B. LOOKED AT, C. A TOOL FOR CUTTING. WHAT DOES SAW MEAN?....RIGHT, LOOKED AT. I LOOKED AT THE KITTENS IN THE BOX. WHAT LETTER IS IN FRONT OF THE CHOICE LOOKED AT?.....RIGHT, B. SO CIRCLE THE LETTER B.
>
> DO THIS PAGE AND THE NEXT PAGE. WORK UNTIL YOU COME TO THE WORD STOP. YOU MAY BEGIN.

Circulate to make sure students do both pages, and after 5 minutes say:

> YOU HAVE ONE MORE MINUTE TO WORK.

After 6 minutes say:

> STOP. EVERYONE TURN TO THE PAGE THAT SAYS STOP.

Page 9 Stop Break (2 minutes)

Lead the children in exercises for a couple of minutes. Then ask them to return to their seats. When the children are quiet, go on to the next page.

Page 10 (3 minutes - paced)

ON THIS PAGE YOU'LL HAVE TO LISTEN CAREFULLY TO KNOW WHAT TO DO. I AM GOING TO READ SOME WORDS. YOU CIRCLE THE WORD THAT IS THE SAME AS THE WORD I SAY. LOOK AT EXAMPLE A. THE FIRST WORD IS THE. ON YOUR PAGE THE WORD THE IS CIRCLED. LET'S DO THE NEXT ONE. LOOK AT EXAMPLE B. PUT A CIRCLE AROUND THE WORD THAT IS THE SAME AS THE WORD I SAY. LISTEN CAREFULLY. WHEN .....WHEN. WHICH WORD DID YOU MARK?.....YES, THE FOURTH WORD, W H E N, WHEN.

Circulate briefly to see that all students are in the right place and marking correctly. Read the remaining words slowly and carefully. Read the line number and word. Repeat each word. Pause about 10 seconds between lines.

LET'S GO ON TO LINE 1. LISTEN CAREFULLY. CIRCLE THE WORD THAT I SAY.

1.	MIGHT.....MIGHT	8.	SOME.....SOME
2.	OF.....OF	9.	NIGHT.....NIGHT
3.	THERE.....THERE	10.	WHOSE.....WHOSE
4.	WAS.....WAS	11.	KNOW.....KNOW
5.	FROM.....FROM	12.	WHERE.....WHERE
6.	ONE.....ONE	13.	WHAT.....WHAT
7.	WHAT.....WHAT	14.	HAVE.....HAVE

Page 11 (2 minutes)

THE DIRECTIONS SAY: THE LETTER C CAN MAKE TWO DIFFERENT SOUNDS. LOOK IN THE BOX:

IN THE WORD CAT THE SOUND IS /K/ LIKE IN KITE. THE LETTER K IS USED TO STAND FOR THE SOUND /K/. IN THE WORD CITY THE SOUND IS /S/, LIKE IN SING. THE LETTER S IS USED TO STAND FOR THE SOUND /S/. CAT, KITE, /K/. CITY, SING, /S/.

READ EACH WORD BELOW, AND FIND OUT WHICH SOUND THE UNDERLINED C MAKES. CIRCLE THE LETTER WHICH SHOWS THE MATCHING SOUND.

LOOK AT THE EXAMPLES.
A. COAT. WHAT SOUND DOES THE UNDERLINED LETTER MAKE? /K/ OR /S/? LISTEN, COAT....RIGHT. COAT. /K/. SO THE LETTER K IS CIRCLED.

LET'S DO THE NEXT ONE. THE WORD IS CIRCUS. WHAT SOUND DOES THE UNDERLINED LETTER MAKE? /K/ OR /S/? LISTEN, CIRCUS....RIGHT, CIRCUS. /S/. SO CIRCLE THE LETTER S.

LOOK AT THE LAST EXAMPLE, RACE. WHAT SOUND DOES THE UNDERLINED LETTER MAKE? YOU CIRCLE THE LETTER OF THE MATCHING SOUND. RACE..... WHAT SOUND DID YOU HEAR?.....RIGHT ,'S/. WHAT LETTER DID YOU CIRCLE?.....RIGHT, S. DO YOU UNDERSTAND WHAT TO DO?

NOW DO THE REST OF THE PAGE ON YOUR OWN, THEN STOP. YOU MAY BEGIN.

Page 12 (2 minutes)

> THE DIRECTIONS SAY: THESE WORDS ARE COMPOUND WORDS. TWO LITTLE WORDS ARE PUT TOGETHER TO MAKE A NEW WORD. DRAW A LINE THROUGH THE NEW WORD TO SHOW THE TWO PARTS.
>
> LOOK AT THE EXAMPLE. THE WORD GOLDFISH IS MADE UP OF THE WORDS GOLD AND FISH. THE LINE SHOWS THE TWO PARTS. LET'S DO THE NEXT WORD TOGETHER. OUTSIDE. WHAT ARE THE TWO WORDS IN OUTSIDE?.....RIGHT, OUT AND SIDE. DRAW A LINE BETWEEN THE TWO PARTS.
>
> NOW DO THE REST OF THE WORDS ON YOU OWN. DRAW ONE LINE IN EACH WORD. GO TO THE END OF THE PAGE, THEN STOP. BEGIN.

As the children finish, say:

> LOOK UP AT ME WHEN YOU FINISH, SO I'LL KNOW YOU ARE READY.... TURN THE PAGE.

Page 13 (2 minutes)

THE DIRECTIONS SAY: READ THE WORD. LOOK FOR THE ROOT WORD IN THE LONGER WORD. DRAW A LINE THROUGH THE WORD TO SHOW THE TWO PARTS.

LOOK AT THE EXAMPLE. JUMPING IS MADE FROM THE WORD JUMP PLUS THE ENDING I - N - G. THE LINE SHOWS THE TWO PARTS. RERUN IS MADE FROM THE WORD RUN PLUS THE PREFIX R - E.

WHAT ABOUT THE NEXT WORD, SLOWLY? WHAT ARE THE TWO PARTS?... RIGHT, SLOW PLUS THE ENDING L - Y. YOU DRAW THE LINE BETWEEN THE TWO PARTS.

NOW DO THE REST OF THE WORDS ON YOUR OWN. DRAW ONE LINE IN EACH WORD. GO TO THE END OF THE PAGE, THEN STOP. BEGIN.

Pages 14 - 15 (9 minutes)

> HERE IS A STORY TO READ. READ THE STORY, THEN ANSWER THE QUESTIONS. CIRCLE THE LETTER OF THE ANSWER YOU CHOOSE. THE END OF THE STORY IS ON THE NEXT PAGE. DO BOTH PAGES. YOU HAVE 9 MINUTES TO WORK. BEGIN.

Circulate to make sure both pages get done. After 8 minutes, say:

> YOU HAVE 1 MORE MINUTE TO WORK.

After 9 minutes, say:

> STOP. CLOSE YOUR BOOKS.

TESTING REPORT FORM
Spring, 1976

Tests Given:_____

Grade Level:_____

Teacher:_____ School:_____

Date:_____ Time:_____

Tester:_____

Number of Students Tested:_____ Number of Students Absent:_____

Conditions of Testing (Problems/Irregularities):

Example Items from Achievement Scales

Scale Name	Number of Items	Description	Example Items
Decoding - Consonant Sounds (speeded)	24	Consonant Sounds. The student must identify the word containing the correct consonants to name a picture. Includes single consonants, blends, and digraphs in initial and final position.	(dog) fog log three see (tree) sink (sing) sick
Decoding - Long Vowels	22	Vowels - Long Vowel, Final E. The student must recognize the role of final e in vowel pronunciation by selecting the correct word to name a picture. Vowels - Digraphs. The student must recognize the long vowel sound of common digraphs.	rop (rope) rap blick bloke (block) sail sell (seal)
Decoding - Consonant Substitution	10	Consonant Substitution. The student must select the correct consonant blend or digraph to substitute in initial position and make a new real word.	hop __op (dr) tw sk
Context Clues - Form of Word	10	Context Clues - Form of Word. The student must use understanding of sentence meaning and knowledge of word structure to select the correct word to fill a blank.	Something that warms you up is a _____. heating heats (heater)

Example Items from Achievement Scales (con't)

Scale Name	Number of Items	Description	Example Items
Word Structure - Compound Words	10	Compound Words. The student must divide simple compound words into two parts.	gold/fish
Word Meaning - Synonyms	18	Synonyms. The student must identify the word with the same meaning as an underlined word.	a little dog A. fast B. funny (C) small D. long
Comprehension - Description	13	Comprehension - Description The student must understand descriptions of characters and emotions or descriptions of settings (including time and place).	Mary felt scared walking through the dark woods.... How did Mary feel? A. happy B. mad (C.) afraid The woods were _____. A. sunny (B.) dark C. rainy

APPENDIX B

Reading Content Categories and Examples of Teacher Logs

Specific Content Categories for Grade 2 Reading Instruction

Specific Content Category Number	Specific Content Category Name	General Content Category Number	Observation Content Category Number
	Decoding		
1	Single consonants	2	2
2	Consonant blends and digraphs	2	2
3	Variant consonants (c,g)	2	2
4	Vowels - short	2	2
5	Vowels - final e pattern - long vowels	1	1
6	Vowels - digraphs	1	1
7	Vowels - dipthongs	2	2
8	Vowels - vowels + r (car)	2	2
9	Complex, multi-syllabic	2	2
10	Silent letters	2	2
11	Sound substitution tasks	2	2
58	Spelling	2	2
14	Other decoding	2	2
	Context Clues		
15	Choosing word(s)which fit gram. context	3	5
16	Choosing word(s)which make best sense (semantic appropriateness)	3	5
17	Choosing correct form of word	3	5
18	Choosing word with correct initial cons.	3	5
19	Choosing correct pronoun	3	5
20	Other context clues	3	5
	Word Structure		
21	Compound words	4	3
22	Identification of root words	5	4
23	Prefixes - meaning and use	5	4
24	Suffixes - meaning and use	5	4
25	Contractions	5	4
26	Syllables	5	4
27	Other word structure	5	4
	Word Meaning		
28	Synonyms	6	5
29	Antonyms	6	5
30	Vocabulary building	6	5
31	Pronoun reference	6	5
32	Multi-meaning words in context	6	5
33	Unfamiliar words in context	6	5
34	Figurative language	6	5
35	Other word meaning	6	5

Comprehension

36	Understanding event detail	7	5
37	Understanding description	7	5
38	Understanding relationships	7	5
39	Understanding main idea	7	5
40	Literal recall	7	5
41	Translation of ideas	7	5
42	Synthesis of ideas, inference	7	5
43	Going beyond the text, prediction	7	5
44	Recognizing facts and opinions	7	5
45	General comprehension	7	5
46	Understanding directions	7	5
47	Picture interpretation to aid comprehension	7	5
51	Understanding signs	7	5
52	Understanding letters	7	5

Areas Related to Reading

48	Dictionary skills		
49	Reference sources in books (table of contents, index, glossary)	8	7
50	Choosing reference sources (dictionary, encyclopedia, card catalog)	8	7
53	Understanding Maps	8	7
54	Understanding Graphs	8	7
59	Grammar	8	7
60	Creative writing	8	7

Reading Practice

12	Sight words	9	6
13	Automaticity of word recognition	9	6
55	Reading for different purposes	9	6
56	Oral reading	9	6
57	Reading for enjoyment	9	6
61	Reading in content areas	9	6
62	Silent reading	9	6
67	Music (reading lyrics)	9	6

Miscellaneous

63	Listening (to story or tapes)	10	-
64	Penmanship and copying	10	-
65	Standardized tests	10	-
66	Foreign language	10	-
68	Dramatics (plays, choral reading...)	10	-

General Content Categories for Grade 2 Reading Instruction

General Content Category Number	General Content Category Name	Observation Content Category Number
1	Long vowels	1 (RL)
2	Other decoding	2 (RD)
3	Context clues	5 (RM)[a]
4	Compound words	3 (RC)
5	Other word structure	4 (RS)
6	Word meaning	5 (RM)[a]
7	Comprehension	5 (RM)[a]
8	Areas related to reading	7 (RO)
9	Reading practice	6 (RP)
10	Miscellaneous	--

[a] Observation content category 5 included general content categories 3, 6 and 7.

READING GLOSSARY

I. DECODING (Knowledge and use of letter-sound correspondence)

SCC 1 Single consonants -
Sounds of single consonants in any position in a word.
Examples: b, c, d, . . .

SCC 2 Consonant blends and digraphs
Blends include st, bl, tr, . . .
Digraphs include ch, sh, th, wh.

SCC 3 Variant consonants
A comparison of several sounds possible for a single consonant.
Examples: "c" in cat vs city, "g" in goat vs giant

SCC 4 Vowel - short
Regular short sound of a, e, i, o, and u

SCC 5 Vowel - final e pattern
Long vowel sound when word ends with e, as in rope

SCC 6 Vowel digraphs
Include ee, ea, ai, oa, and ay

SCC 7 Vowel dipthongs
Include oi, oo, ou, oy, au, and aw

SCC 8 Vowel plus r
Vowel sound modified by following consonant r
Examples: ar, er, ir, or, ur, air, ear

SCC 9 Complex, multi-syllabic
Decoding of multi-syllabic words, includes internal patterns, syllable influence on vowel decoding

SCC 10 Silent consonants
Letters which are not sounded in a word
Examples: comb, knit

SCC 11 Sound substitution tasks
Substituting one sound for another to create a new word.
Example: fan, _an, p, pan

SCC 12 Sight words
Recognition of common words, especially function words (the, of, to, would, could, were) and words with irregular spelling (are, come, put)

SCC 13 Automaticity of word recognition
Practice to improve speed of word recognition, so that the process becomes automatic.

II. CONTEXT CLUES

Context clues involve using the context of a phrase, sentence, or story to help identify a word or to predict a missing part. Different types

of context clues emphasize different aspects of the linguistic context or of the word to be identified.

SCC 15 Choosing word(s) which fit the grammatical context.
Father is sleeping _____ the bed.
night
in
warm

SCC 16 Choosing the word(s) which make best sense in the blank.
The _____ lives in the royal palace with her father.
princess
prince
sister

SCC 17 Choosing the correct form of a word.
Both of the _____ are asleep.
baby
babying
babies

SCC 18 Choosing the word with the correct initial consonant.
Don't _____ the milk.
sill
spill
still

SCC 19 Choosing correct pronoun.
John dropped his book and then picked _____ up.
them
it
him

III. WORD STRUCTURE

SCC 21 Compounds
Words formed by combining two smaller words - "mailbox"

SCC 22 Identification of root words
Recognizing the root word in a derived form - "playing" root = play

SCC 23 Prefixes -
Include re-, un-, dis-, pre-, . . .

SCC 24 Suffixes
Include grammatical endings like -s, -ed, and -ing and other suffixes like -ly, -ful, -ness, -less . ...

SCC 25 Contractions
do not - don't

SCC 26 Syllables - separation of a word into sound units preamble - pre am ble

IV. WORD MEANING

SCC 28 Identifying words with similar meanings - quick = fast

SCC 29 Antonyms
Identifying words with opposite meanings - large vs. small

SCC 30 Vocabulary building
Learning word meanings

SCC 31 Pronoun reference
Identifying the referent of a pronoun.
"John washed his car." his=John's

SCC 32 Multi-meaning words in context
Identifying the specific meaning of a word in a particular context.
I cut my hand on a piece of paper.
a. part of a clock
b. part of a person
c. give something

SCC 33 Unfamiliar words in context
Deducing the meaning of an unfamiliar word through its use in context.
The car was so badly entrenched in the mud that we had to call a tow truck.

a. stuck
b. built
c. dirty

SCC 34 Figurative language
Recognizing the meaning of a word or phrase used in a nonliteral sense, including simile, metaphor, and idiomatic expressions.
The soldier fought like a tiger to protect his home.
a. in a striped uniform
b. with sharp claws
c. bravely and fiercely

Oh, how Peter wished he could whistle! Peter saw his friend Sam playing with a dog. Whenever Sam whistled, the dog ran straight to him. Peter wished he could do that trick with his own dog, Willie. Peter tried and tried to whistle, but he just couldn't.

Peter went into his house and put on his father's old hat, to make himself feel more grown-up. He looked into the mirror to practice whistling. Still no whistle!

The next day Peter went outside to play. He sat on the front steps and tried to whistle. Then Peter saw his dog coming. Quick as a wink, Peter hid behind the stairs. He wanted to surprise Willie with a whistle. Peter puffed up his cheeks. He blew and blew and blew. Suddenly, out came a real whistle. Willie stopped and looked around to see who was making the noise.

"It's me," Peter shouted. He jumped out from behind the stairs. Willie raced straight up to him.

The following illustrations refer to the story above.

V. COMPREHENSION

SCC 36 Understanding event detail. What did Peter put on?

SCC 37 Understanding description - Where did Peter hide?
How did Peter feel at the end of the story?

SCC 38 Understanding relationships - What happened first?
Why did Willie stop and look around?

SCC 39 Understanding the main idea - What is the story mostly about?
What lesson can we learn from the story?

SCC 40 Literal recall - recall of information exactly as stated in the story.
What did Peter wish he could do?
a. have a dog
b. whistle
c. go to school

SCC 41 Translation of ideas
Recognizing ideas stated in different words; ability to paraphrase; recall of information when ideas are restated.

What happened when Sam whistled?
a. Peter went over to see Sam
b. A dog went over to see Sam
c. Peter whistled too

SCC 42 Synthesis of ideas, inference
Ability to integrate information from different points in a text; understanding ideas directly implied by a text.
What trick did Peter want to do with his dog?
a. teach Willie to whistle
b. put an old hat on Willie
c. whistle to call Willie

SCC 43 Going beyond the text, prediction
Relating the text to one's own knowledge and experience; supplying from experience information not directly given in a text. Includes predicting what might come next in a story.
How did Peter feel when Willie came running?
a. happy
b. scared
c. mad

SCC 44 Recognizing facts and opinions
Evaluating statements and the basis for their acceptance. Included evaluating the qualifications of a speaker.
Which of the following is a <u>fact</u> rather than an opinion?
a. The Etruscans built cities long ago.
b. The jewelry made by the Etruscans was the most beautiful ever made.
c. Historians do not know as much as archeologists do.

SCC 45 General Comprehension
Silent reading or general reading practice, where comprehension involves a mixture of the facets above: (Please use one or more of the specific categories, if possible.)

Example: Attendance/Group Composition Record

READING MATH (circle one) Teacher No. 3 Grade 2

Student's Name	Group	Week of October 27-31, 1975				
		M	T	W	Th	F
1. ID # 239	3					
2. ID # 240	2					
3. ID # 241	2	Absent				
4. ID # 242	3					
5. ID # 243	3			Absent		
6. ID # 247	2					
7. ID # 251	3				No Absences	No Absences
8. ID # 252	2					
9. ID # 253	2					
10. ID # 254	3					
11. ID # 255	3					
12. ID # 256	2					
13. ID # 257	2			Absent		
14. ID # 258	2					
15. ID # 259	2					
16. ID # 260	3					
17. ID # 262	3					
18. ID # 263	2					
19. ID # 264	2					
20. ID # 265	3					
21. ID # 266	3					
22.						
23.						
24.						
25.						
26.						
27.						
28.						
29.						
30.						
31.						
32.						
33.						
34.						

Example: Teacher Log removed due to very poor copy

APPENDIX C

Teacher Rating Forms

Rating of Student Attentiveness

The lesson plan logs tell us how much time was allocated by the teacher to different settings and objectives in reading or mathematics. But there is often a difference between the amount of time taken up by a lesson and the amount of time which is active learning time for a student. We would like to get a more accurate estimate of the amount of actual learning time for an individual student. This will be used as a "correction factor" in the interpretation of the log information.

A student who is paying attention	works actively on assignments participates or listens attentively during class discussion
A student who is not paying attention	talks to his neighbor daydreams draws pictures on his paper falls asleep walks around the room waits for help

Children differ in the amount of time they pay attention in class. Based on your observations of the children so far this year, please rate each child in your class as to the percentage of time that child generally pays attention. Think only of the subject matter for which you are keeping logs. If you are keeping math logs, think about how much of the time a student pays attention during math lessons. If you are keeping reading logs, think of the time you record as reading or reading related.

We suspect that children may differ in attentiveness depending on whether or not an adult is present. For this reason, we would like you to rate each child twice. First rate the children for settings in which an adult is present (either seatwork with an adult supervising or group work with an adult). Then rate the children a second time for settings with no adult present.

One way to go about this task is to go through the following steps:

1. Think of a typical 40 or 50 minute lesson period. Think first of settings where an adult is present to supervise and encourage attention. During what percentage of the time would a student by likely to pay attention to the lesson? On the form labeled "Adult Present," assign each student a rating.
2. Shift your thinking to a 40 or 50 minute period where the students are left to work on their own without an adult. What percentage of the time would a student be likely to pay attention under these conditions? Record your ratings on the form labeled "No Adult."

Use as many or as few of the categories as you wish to indicate the differences in attentiveness among your students. The descriptions below may help as guidelines.

91-100%	The child almost always attends to the learning task.
71-80%	The child sometimes loses time through temporary inattention or general classroom disruption but he tends to work more often than not.
51-60%	The child is as likely to be distracted as he is to work. Only about half the period is spent attending to the task.
21-30%	The child is frequently distracted and inattentive. Large periods of time may be lost through inattention. The child may be noticeably disruptive in class or may simply daydream a lot.
0-10%	The child almost never attends to the learning task.

Teacher's Name_____.

Rating of Student Attentiveness

PUT A CHECK IN THE APPROPRIATE BOX

Student	Adult Present 0-10%	11-20%	21-30%	41-50%	51-60%	61-70%	71-80%	81-90%	91-100%

Teacher's Name_____

Rating of Student Attentiveness

PUT A CHECK IN THE APPROPRIATE BOX

Student	No Adult 0-10%	11-20%	21-30%	41-50%	51-60%	61-70%	71-80%	81-90%	91-100%